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DIESEL PROGRESS



FIVE DOLLARS PER YEAR

FEBRUARY, 1954

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**"CLEANER
THAN WE
BELIEVE
POSSIBLE"**

FROM a leading potash producer (national report on diesel performance):

"Texaco has kept our diesels cleaner. Savings on operating and maintenance while."

This company uses one of the famous — the one that is exactly right for their particular operating conditions.

Approved by leading diesel builders, it is a complete line of diesel, gas and diesel especially refined to make engines give longer periods between overhauls.

For more than twenty years, more stations in the United States have been lubricated with Texaco than with any other brand.

Whatever the type, size or speed of your engine, or fuel used — there is one of the *Texaco Ursa Oil* series to assure clean, efficient, lower cost operation.

Let a Texaco Lubrication Engineer help step up your engine efficiency. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TUNE IN:
METROPOLITAN OPERA
radio broadcasts
every Saturday afternoon.
See newspaper for
time and station.



TEXACO

**WAV
PAG**



NAVY ENGINES

URSA OILS FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES

"CLEANER THAN WE BELIEVED POSSIBLE"

FROM a leading potash producer (name on request) comes this report on diesel performance:

"Texaco has kept our diesels cleaner than we believed possible. Savings on operating and maintenance have been very worth while."

This company uses one of the famous *Texaco Ursa Oil* series — the one that is exactly right for their particular engines and operating conditions.

Approved by leading diesel builders, the *Texaco Ursa Oil* series is a complete line of diesel, gas and dual-fuel engine lubricants especially refined to make engines give *more power with less fuel* for longer periods between overhauls. That is why —

For more than twenty years, more stationary diesel horsepower in the United States has been lubricated with Texaco than with any other brand.

Whatever the type, size or speed of your engine, or fuel used — there is one of the *Texaco Ursa Oil* series to assure clean, efficient, lower cost operation.

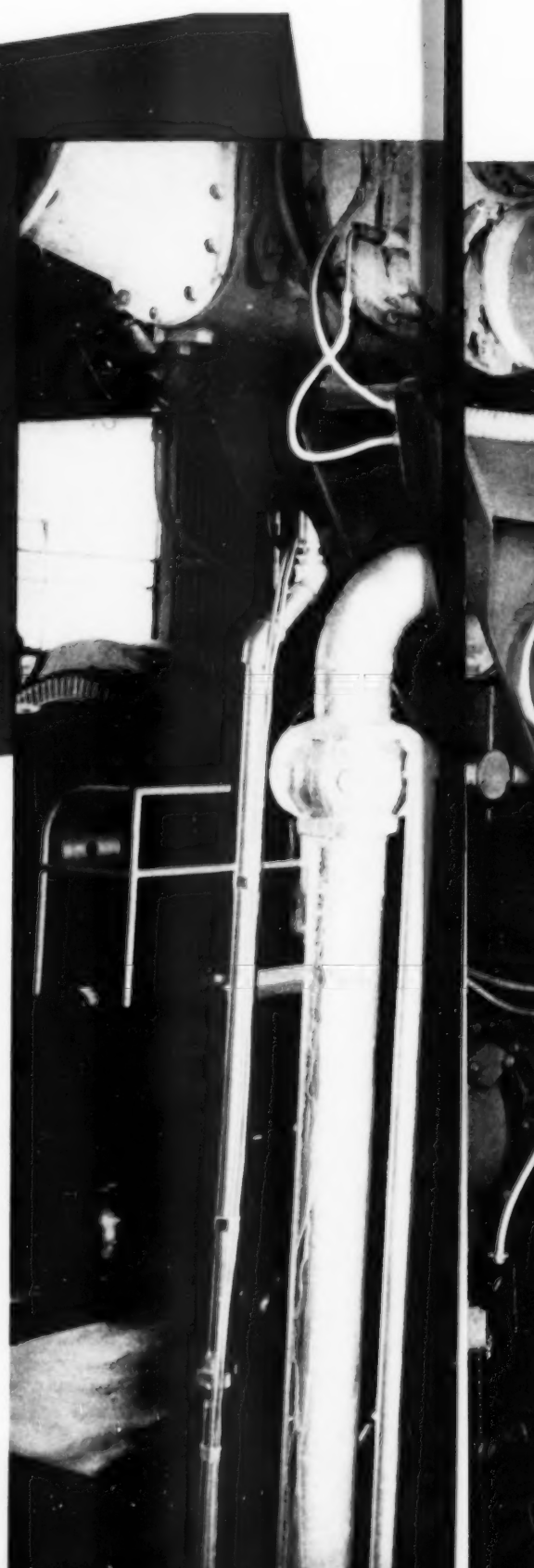
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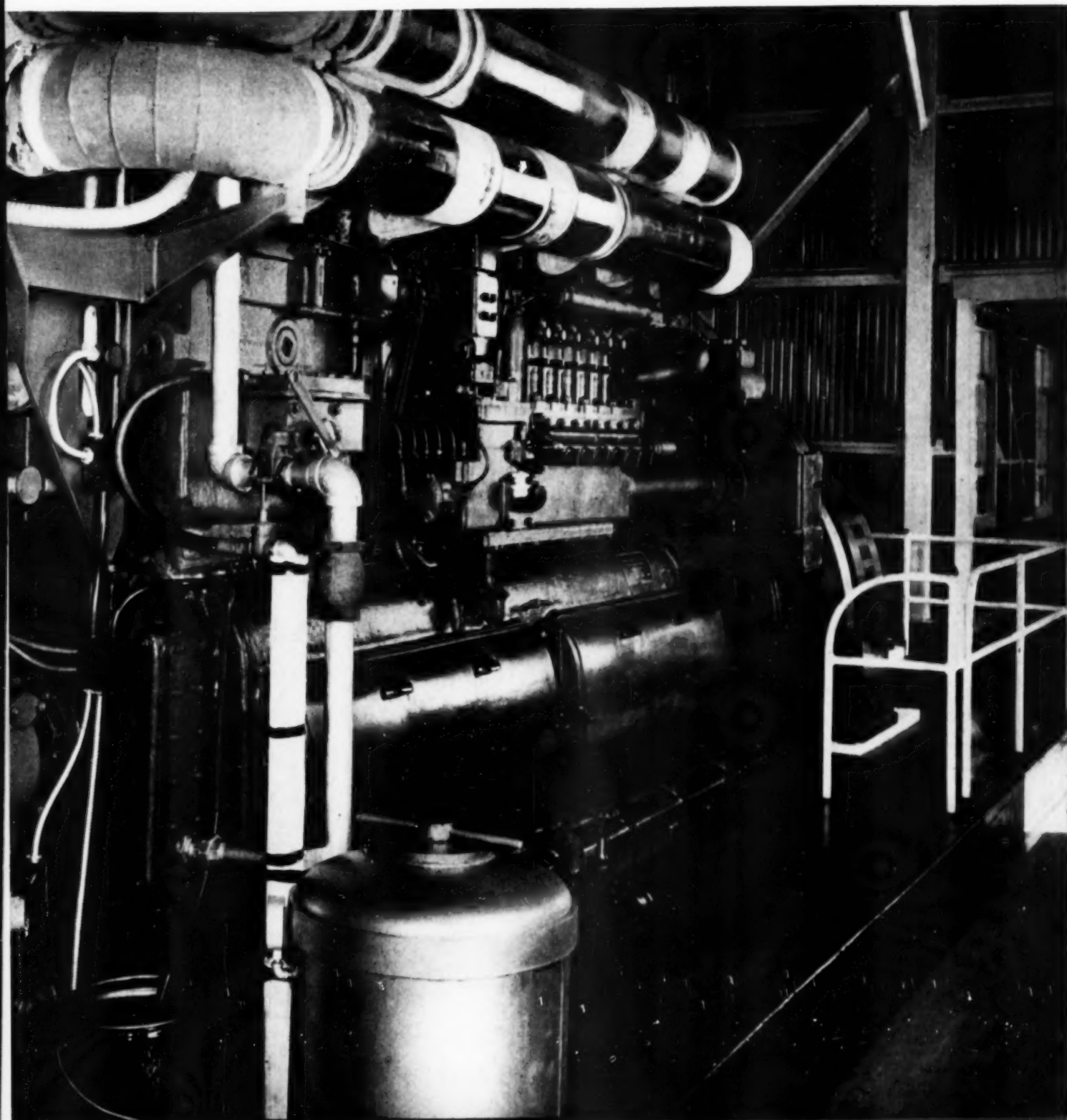
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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TEXACO





URSA OILS FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES

NEW LINK for VANCOUVER'S COMMERCE



GM Diesel-Electric ferry *Kahloke*, owned and operated by Black Ball Line, Ltd., Victoria, B.C. The boat was redesigned by Gilbert Anderson and rebuilt by Yarrows Shipyard in Victoria, B.C. Four GM Model 16-278A Diesels provide main propulsion power and two GM Model 8-268A Diesels furnish power for ship services.

* * *

The General Motors Diesel-Electric ferry *Kahloke* provides the first truck and bus route between West Vancouver, B. C. and Nanaimo on Vancouver Island. GM Diesel-Electric Drive has already established its reputation for dependability with the Black Ball Line. The company's first GM Diesel-Electric-powered ferry, the *Chinook*, has operated over 400,000 miles in six years without missing a schedule.



CLEVELAND DIESEL ENGINE DIVISION

GENERAL MOTORS • CLEVELAND 11, OHIO

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DIESEL and GAS ENGINE PROGRESS

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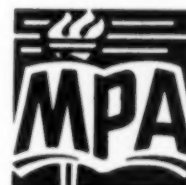


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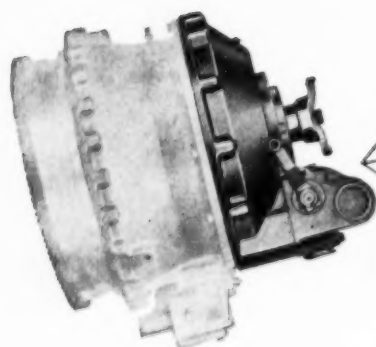
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FRONT COVER ILLUSTRATION

The work boat *Janis*, owned by Cunningham-Kiewit Company of Omaha, Nebraska. The vessel is powered by two 500 hp. Model NHRMS-600 Cummins diesels. It is one of four Cummins powered craft to push a fleet of cargo barges for the owners.

Faster, safer downhill hauling with **New Allison Torqmatic Brake**



**Speeds job-cycle time—
cuts maintenance costs—no wearing parts
cuts service brake lining wear**

ALLISON's new TORQMATIC BRAKE brings faster, safer downhill hauling to heavy-duty trucks. On-the-job tests prove that in many cases drivers can more than *double* present downhill speeds with complete safety. This new dynamic brake speeds job-cycle time for more trips per shift—more pay loads per day.

Proved in Field Tests

This revolutionary new TORQMATIC BRAKE increased round trips 50% per day on year-long tests. Trucks safely came down a 10% grade with a 34-ton load at 12 miles per hour compared to 6 m.p.h. for trucks with friction brakes only. With the TORQMATIC BRAKE, the regular service brake linings lasted from 6 to 8 months—without it they required monthly replacement.

Increased Safety—Better Control

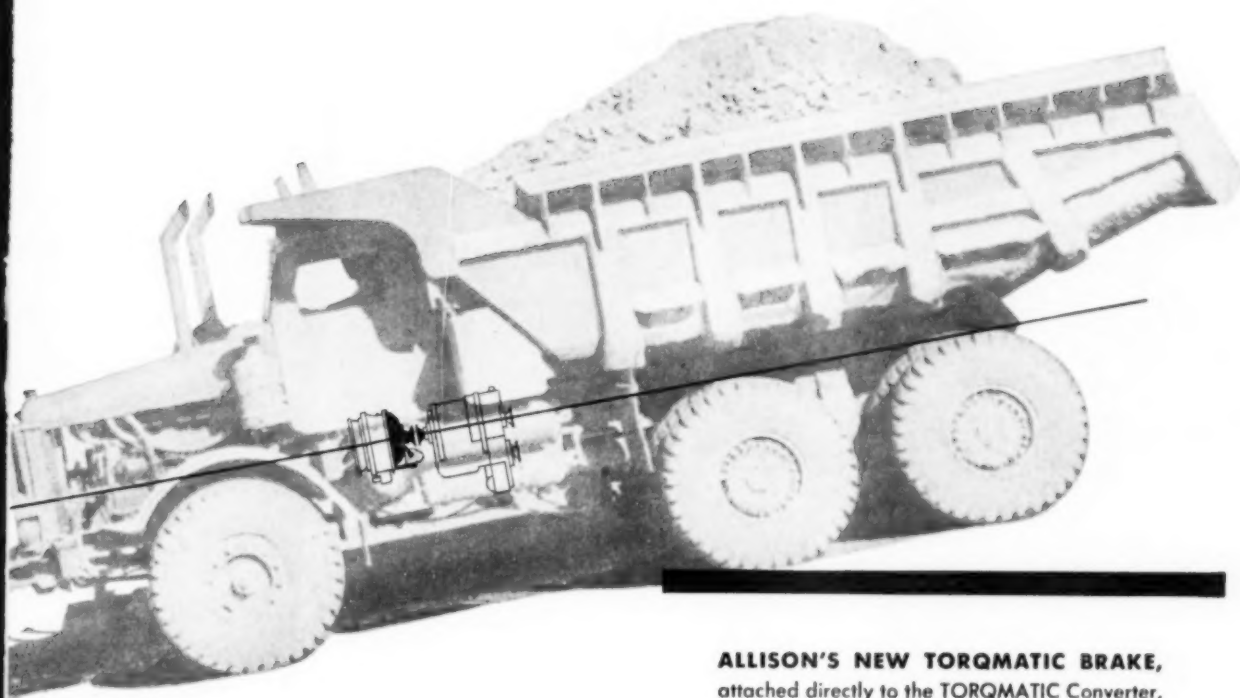
There are no active braking parts to burn up or wear out in the TORQMATIC BRAKE. Drivers have complete control at all times—can brake continuously even going down the steepest grades with the heaviest loads. Trucks never “run away” from the driver. The truck's own rolling force produces the braking power needed, to the limit of the driveline components' strength.

Works on Oil

Oil does all the braking work—absorbs all the braking force. The new TORQMATIC BRAKE takes over from friction brakes on downhill hauls, saves regular service brakes for complete stops or “snubbing” on curves. It's



Allison



ALLISON'S NEW TORQMATIC BRAKE, attached directly to the TORQMATIC Converter, has three major parts — a turning rotor (or "paddle wheel") attached to the torque converter; non-moving or fixed stator vanes cast into the brake housing; and a control valve.

Here's How it Works: To brake a truck going downhill, the driver pulls the handy control lever to let oil into the brake. The truck's wheels turn the rotor or "paddle wheel" through the truck's transmission. The rotor throws the oil against the stator vanes which resist the oil flow. This makes it harder for the rotor to turn and correspondingly makes it harder for the truck's wheels to turn. The driver gets more braking by letting more oil into the brake. He reduces braking by reducing the amount of oil in the brake. The new brake provides up to 400 h.p. of continuous braking effort.

the *first* downhill braking unit designed and installed as an integral part of the truck's driveline. It bolts directly on the TORQMATIC Converter housing—adds only 4 inches to the converter's length. The brake and converter use the same oil. There are no freezing problems in winter. The TORQMATIC BRAKE can be specified in new trucks equipped with Allison TORQMATIC DRIVES.

If you're hauling on hilly, mountainous downhill runs, you can cut costs and increase production with Allison's new TORQMATIC BRAKE. For full details, contact your truck manufacturer or write for Bulletin SA 1026 to:

ALLISON DIVISION OF GENERAL MOTORS
Box 394D, Indianapolis 6, Indiana

TORQMATIC BRAKE

NEWEST MEMBER OF THE TORQMATIC DRIVELINE

GM DIESEL
CASE HISTORY No. 639-51



USER: Geo. M. Brewster & Son, Inc.,
Bogota, N. J.

INSTALLATION: Four GM Diesel-powered
Ingersoll-Rand Gyro-Flo 600
compressors supplying air for
9 I-R 71 wagon drills.

PERFORMANCE: "Completely satisfac-
tory," says operator Tom Malone.
Units shown were delivering air
to the tools through 1200 to
1600 feet of line--maintaining
steady pressure of 100 to 110 psi.

It pays to STANDARDIZE on



2400 CUBIC FEET OF AIR PER MINUTE ON NEW YORK THRUWAY ROCK CUT

Geo. M. Brewster & Son now operate a total of 18 General Motors Diesel-powered Gyro-Flo compressors, including this battery of four capable of supplying 2400 cubic feet of air per minute for rock drills on a section of the New York Thruway, near Kingston.

These modern rotary compressors take full advantage of GM Diesel's smoother-running 2-cycle operation to maintain a steady flow of nonpulsating air at 100 psi or better. And compactness of the GM 2-cycle design makes these units smaller and lighter for quick, easy movement from job to job.

This inherent engine design superiority—plus interchangeability of lower-cost parts, readily available through a world-wide GM Diesel service organization—explains why GM Diesel power is a favorite of contractors on so many jobs. Next time you order equipment, it will pay you to specify GM Diesel. Available as original or replacement power in more than 750 different models of equipment. Write us for complete list.

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.



Typical installation of
American Hammered
Conformable Oil Rings

AMERICAN HAMMERED CONFORMABLE OIL RING

Insures constant unit pressure

for positive oil control! You keep your oil consumption down when you install Koppers American Hammered Conformable Oil Rings! This service-tested piston ring conforms readily to meet cylinder distortion because its flexible cast iron member is pressed outward by an abutment type spring which exerts uniform radial pressure around the entire circumference.

Narrow bearing surfaces on either side of the channel give the ring a uniform unit pressure on the cylinder, enabling it to seat promptly and assuring maximum removal of excess oil

throughout its lifetime. And the Conformable Oil Ring has a longer useful life because its low spring rate and uniform lands result in negligible changes in pressure as the ring wears.

Easily installed, it is ideal for both 2-cycle and 4-cycle Diesel & Gas engines; comes in 4" to 25" diameters with a minimum width of 1/4". Write, wire or phone us today for full information on how the Conformable Oil Ring can improve your operation . . . or for expert help in any piston or sealing ring problem. KOPPERS COMPANY, INC., *Piston Ring Dept.*, 1586 Hamburg Street, Baltimore 3, Maryland.



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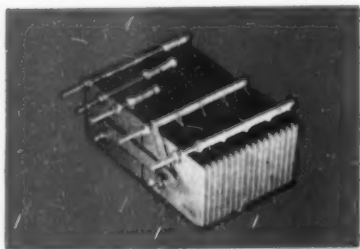
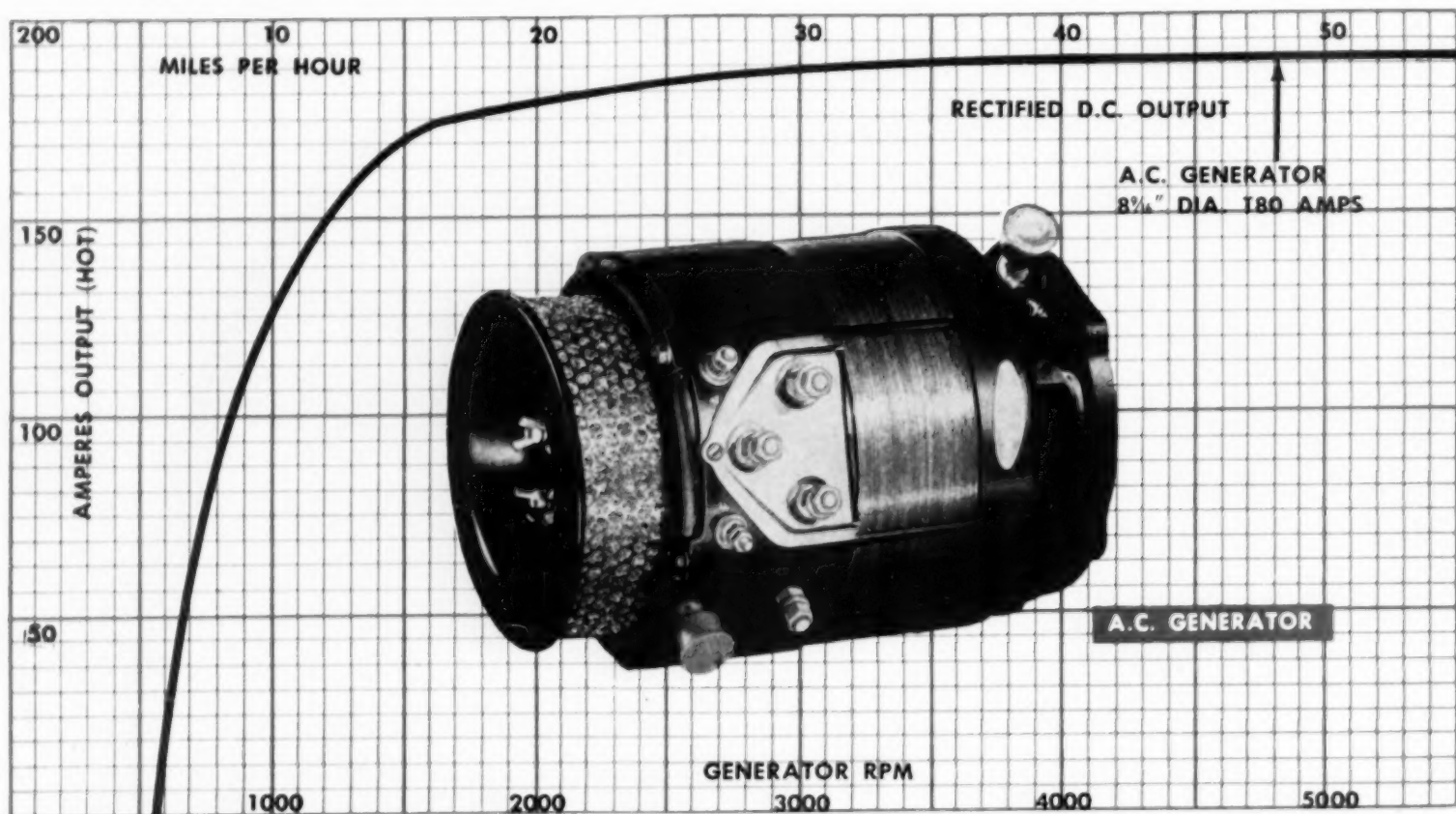
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Company.....
Address.....
City..... Zone..... State.....

Power Packed and

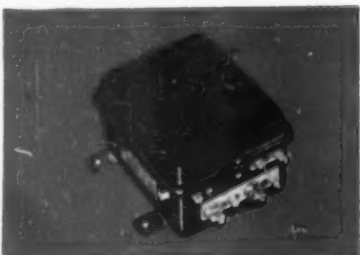


DELCO-REMY A. C. GENERATOR

Heavy-Duty 180-Ampere Output Capacity



Rectifier



Regulator

The Delco-Remy A.C. generator is the heart of a 12-volt A.C.-D.C. electrical system designed specifically for modern buses with fluorescent lighting and extra-heavy electrical loads.

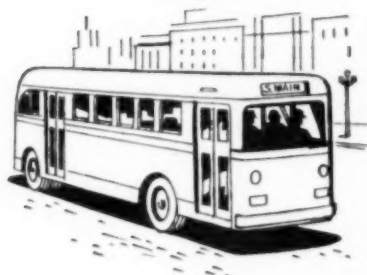
Desirable performance characteristics include cut-in at approximately 550 generator rpm . . . maximum output of 180 amperes at approximately 2000 rpm. The new generator supplies not

only alternating current for fluorescent lights but also ample direct current for the heaviest electrical loads coupled with lengthy engine-at-idle periods.

Impressive features of the new generator are its light weight, its very high output capacity, and its ability to operate over a wide speed range with greatest efficiency. Specify Delco-Remy electrical equipment on your new buses.

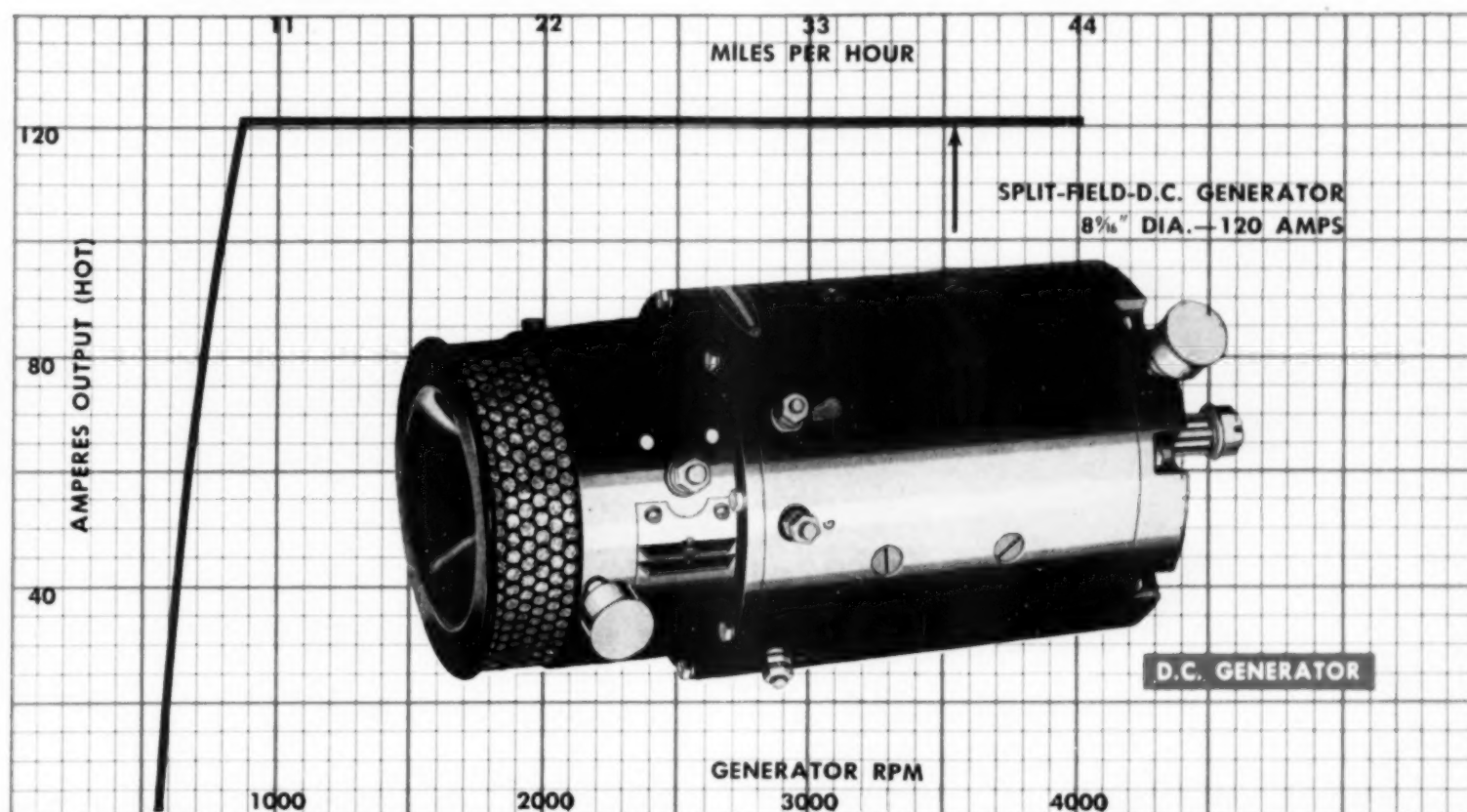
WHEREVER WHEELS TURN OR PROPELLERS SPIN

Right for the Job



DELCO-REMY D. C. SPLIT-FIELD GENERATOR

Heavy-Duty 120-Ampere Output Capacity

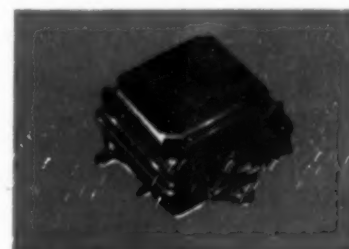


The Delco-Remy 12-volt split-field generator and its companion regulator are rugged and dependable—designed to meet the needs of transit buses having increased electrical loads coupled with a high percentage of engine idling time.

Desirable performance characteristics include low cut-in, high output at engine idle, and quick attainment of maximum output. Cut-in occurs at ap-

proximately 550 generator rpm; output reaches 70 amperes at approximately 700 rpm, maximum controlled output of 120 amperes above 850 rpm.

Operating benefits include reduced battery cycling, long battery life, and a simplified electrical system with sustained voltage—at no sacrifice in ruggedness or dependability. Specify Delco-Remy electrical equipment on all of your new buses.

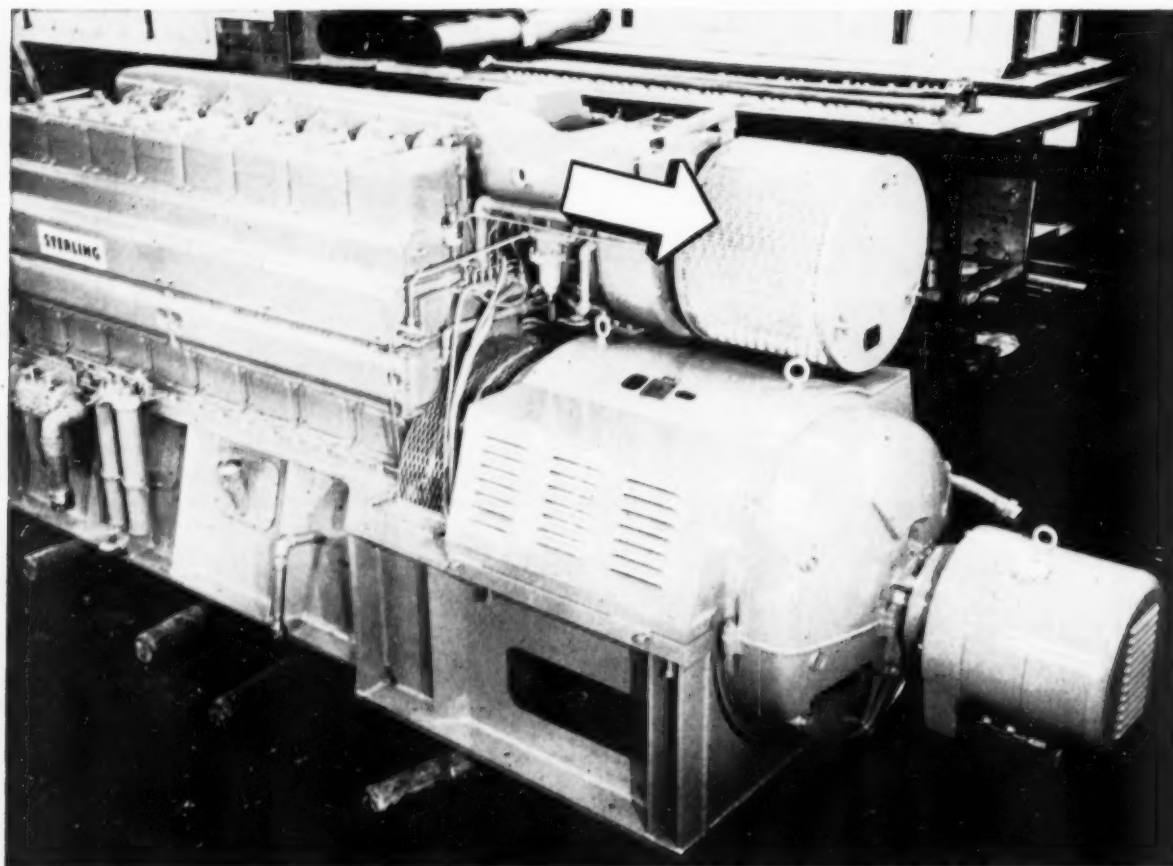


Regulator

Delco-Remy

DIVISION, GENERAL MOTORS CORPORATION, ANDERSON, INDIANA

WHEREVER WHEELS TURN OR PROPELLERS SPIN



Air-Maze filter-silencers cut wear, muffle noise of Sterling diesels used in Navy mobile generating stations

TO MAKE SURE THE U. S. NAVY has an ample supply of electric power wherever it may go, mobile generating stations are equipped with diesels like this 1000 h. p. Sterling VD-8 engine. This station has a net output of 600 kilowatts.

These Sterling turbocharged engines use Air-Maze filter-silencers to solve the double problem of cleaning and quieting intake air. A permanent, cleanable filtering element keeps damaging dust out of the engine's

parts, reduces wear, cuts overhaul costs. A specially designed acoustical chamber dampens air intake noise.

Air-Maze filters and filter-silencers are available in a wide range of designs, including oil-bath as well as cylindrical and flat panel types.

For help with your filter problems, contact your nearby Air-Maze representative or write The Air-Maze Corporation, 25000 Miles Road, Cleveland 28, Ohio.

The biggest names in diesels are protected by Air-Maze filters

AIR FILTERS
SILENCERS
SPARK ARRESTERS

AIR-MAZE

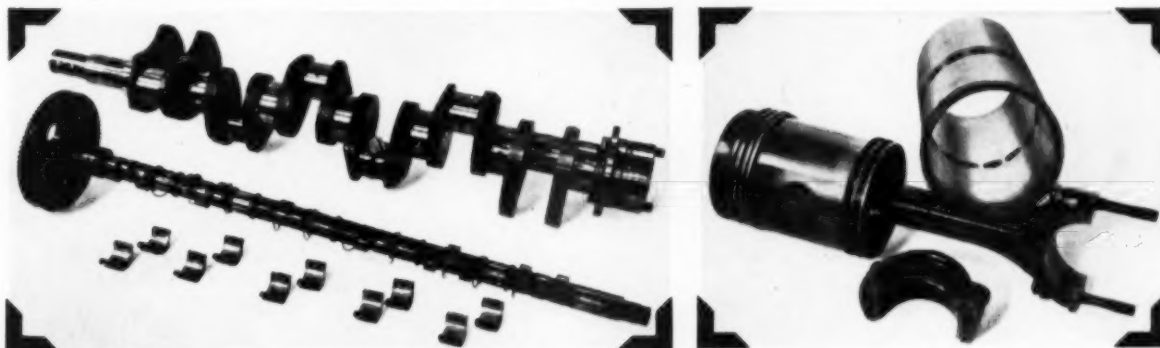
The Filter Engineers

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS

THE ENGINEER'S REPORT

| | |
|-----------|---|
| | DATA |
| LUBRICANT | RPM DeLo Oils |
| UNIT | 6-71 GMC diesel |
| SERVICE | Mainline bus service |
| PERIOD | 1 Year |
| FIRM | Pacific Greyhound Lines, San Francisco |

Only 0.003 inch liner wear in 200,275 miles!



LUBRICATED WITH RPM DELO SPECIAL LUBRICATING OIL, these representative parts from a diesel engine of a Pacific Greyhound bus appear just as they did when the engine was torn down after 200,275 miles continuous service. Mileage was accumulated during one

year's operation in the variable conditions on the Los Angeles-El Paso, Texas run. Wear on liners miked only 0.003 inch, camshaft 0.0015, and crankshaft journals only 0.0025 out of round. There were no broken rings or other parts.



THE ENGINE WAS EXCEPTIONALLY CLEAN. Note that there were no deposits on the pump screen or in pan. RPM DELO Oils keep contaminants in suspension so they flow out when oil is drained.



FREE BOOKLET on the RPM DELO Oils gives you complete information on how to meet any heavy-duty engine operating condition with one of these oils. Write or ask for it today.



TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.

How RPM DELO Oils reduce wear, corrosion, oxidation in all Heavy-Duty Engines



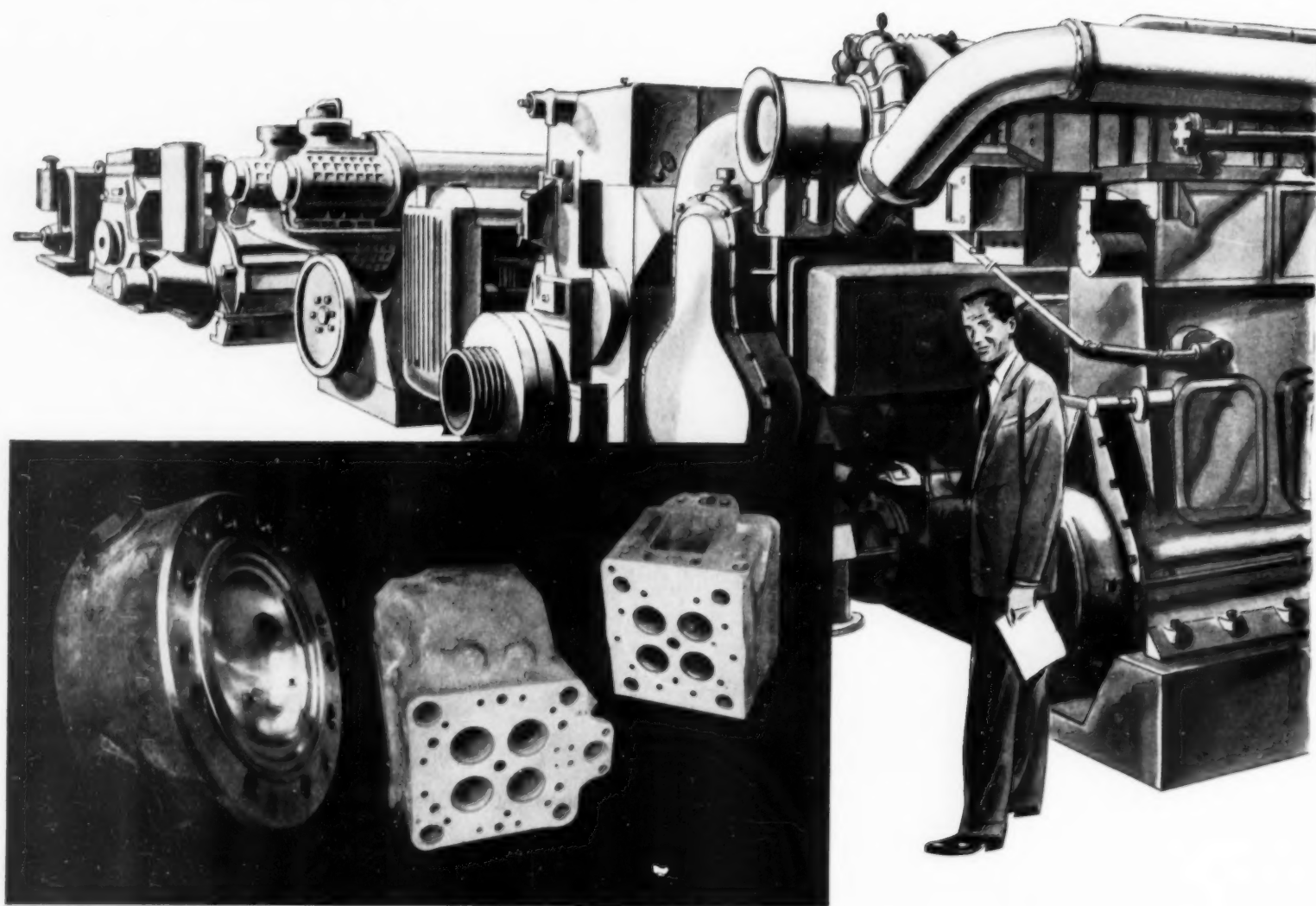
- A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.
- B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent piston scuffing.
- C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

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STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

ALUMINUM HEADS

any type, any size...from one source... **ALCOA!**



Aluminum cylinder heads—large or small, with or without valves, two or four cycle—are now available from a single source of supply... Aluminum Company of America!

Aluminum's high thermal conductivity keeps exhaust valves and fuel injectors cooler... lowers thermal stresses. Aluminum is free from scale formation, and its ability to handle greater heat loads gives an added safety factor, longer trouble-free life!

Aluminum's great weight reduction helps servicing and maintenance procedures.

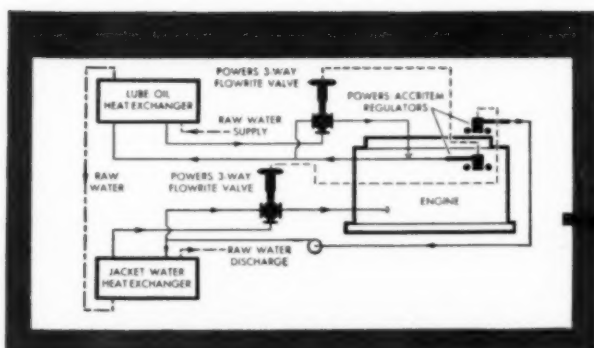
Years of experience in our foundries go into every Alcoa® Aluminum cylinder head casting. If you are a diesel engine manufacturer, get in touch with Alcoa for a complete rundown of all applications of aluminum. If you're a user of diesel power, look to aluminum for longer trouble-free operation. For information on all of Alcoa's many facilities, call your nearby Alcoa sales office—listed under "Aluminum" in your classified directory—or write: ALUMINUM COMPANY OF AMERICA, 1987-B Alcoa Building, Pittsburgh 19, Pennsylvania.



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Right for the Job!

in the Hershey, Michigan Plant of
THE WOLVERINE ELECTRIC COOPERATIVE



Winner of Award for most economically operated REA station in 1952. Six engines helped earn this distinction: 3 Fairbanks-Morse 3500 hp. Dual-Fuel Engines and 3 Cooper-Bessemer Dual Fuel engines.
Consulting Engineers: J. & G. Daverman Co., Grand Rapids, Mich.



3 FAIRBANKS-MORSE 3500 H.P. DUAL-FUEL ENGINES

POWERS ACCRITEM REGULATOR below is compressed air or water operated



Six of these Regulators and six FLOWRITE valves control lube oil and jacket water used in the F-M engines above.

Temperature sensitive bulb of regulator is inserted in lube oil or jacket water line. Has easily adjusted temperature adjustment dial. Rugged construction withstands vibration and insures years of dependable service. Is unsurpassed for reliability and power to control diaphragm valves.

Left: POWERS 3-Way FLOWRITE Control Valve. Six 6" pipe size valves are used in the above installation. They have many superior features which make them especially suited for large engines.



POWERS Safeguards Engine Investment with RIGHT Type of Temperature Control for LUBE OIL and JACKET WATER

For each engine or air compressor there is a "best temperature for the lube oil and cooling water". To insure that temperature at all times regardless of variations in load or seasonal changes in temperature of water supply, install Powers Thermostatic Regulators.

Powers Regulators have been time tested and proven reliable on many large and small installations. ACCRITEM Regulators and FLOWRITE Valves shown at left are unsurpassed for dependable control of large size valves. For smaller engines Powers No. 11 Self-Operating Regulators have been widely used for many years. Either of these controls can be applied to your present engines if they are not already protected.

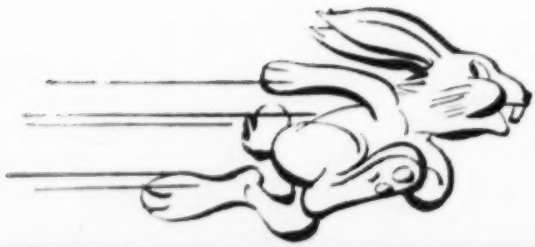
For the Right type Control for Your Engines or Air Compressors—contact Powers nearest office or write us direct. (163)

THE POWERS REGULATOR COMPANY

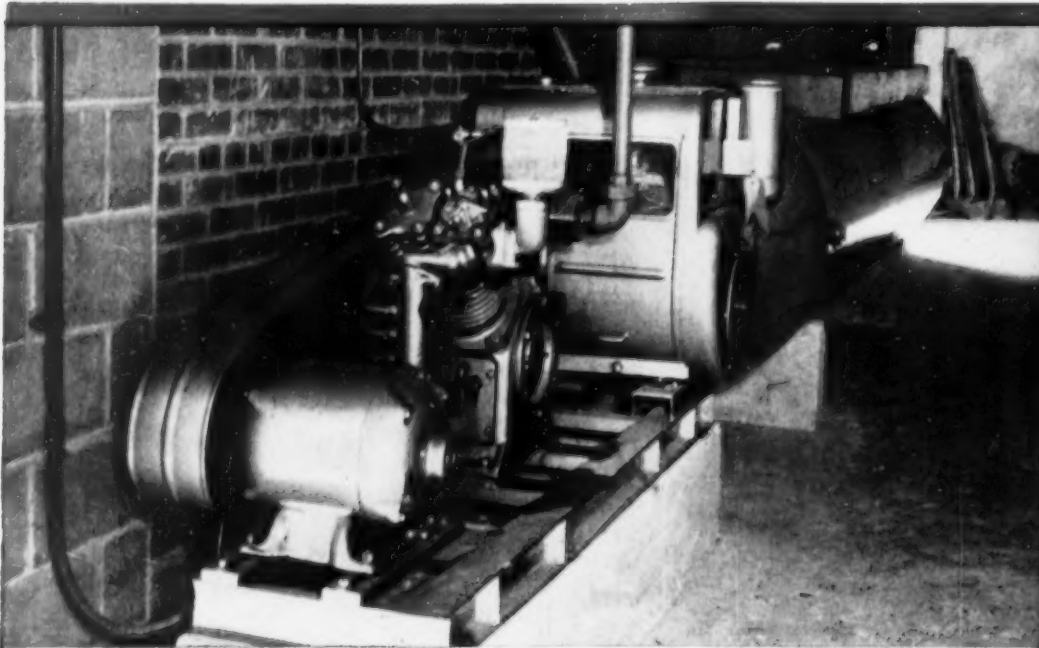
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OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL



When it comes to starting up...



GARDNER-DENVER *Compressors*

**Keep Starting
Air Pressure High**

Automatic controls.

Gasoline or electric
drive, or both.

Quality to match your
diesel installation.

GARDNER-DENVER *Air Starters*

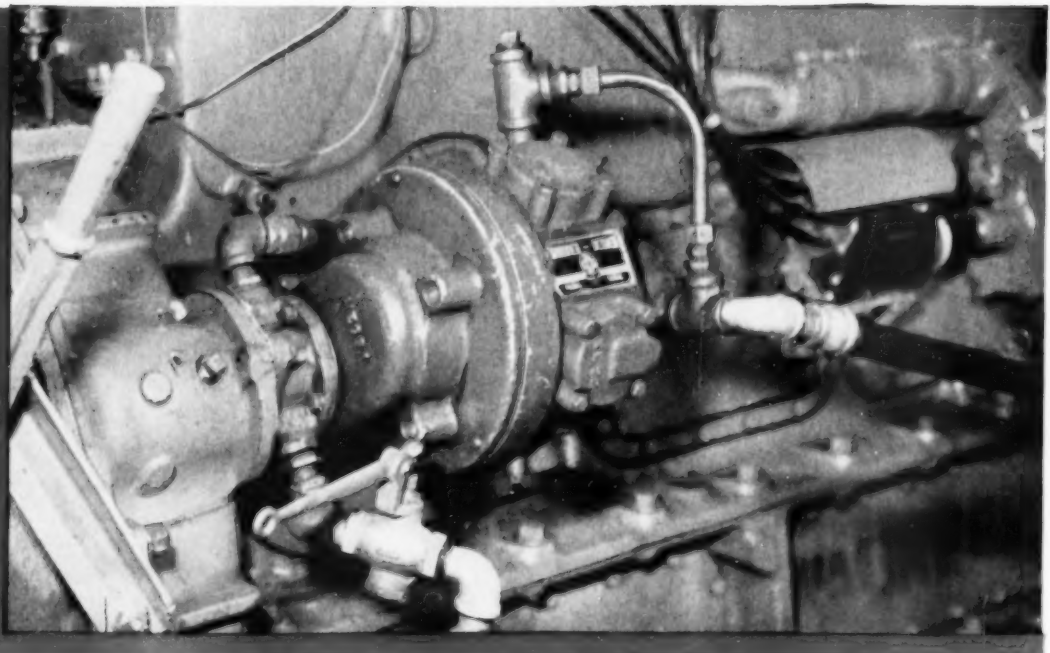
**Take Hold
Smoothly and Firmly**

Easy on the ring and
pinion gears.

Powerful cranking in
any weather.

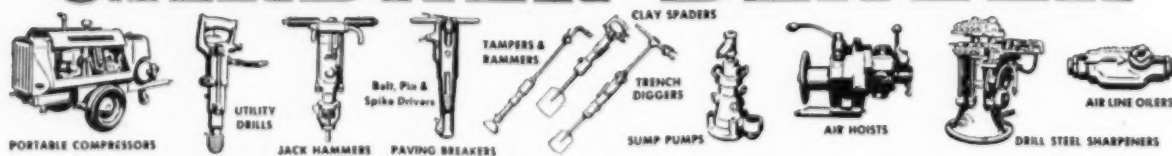
Fit standard S.A.E.
mounting flanges.

Write for descriptive bulletin.



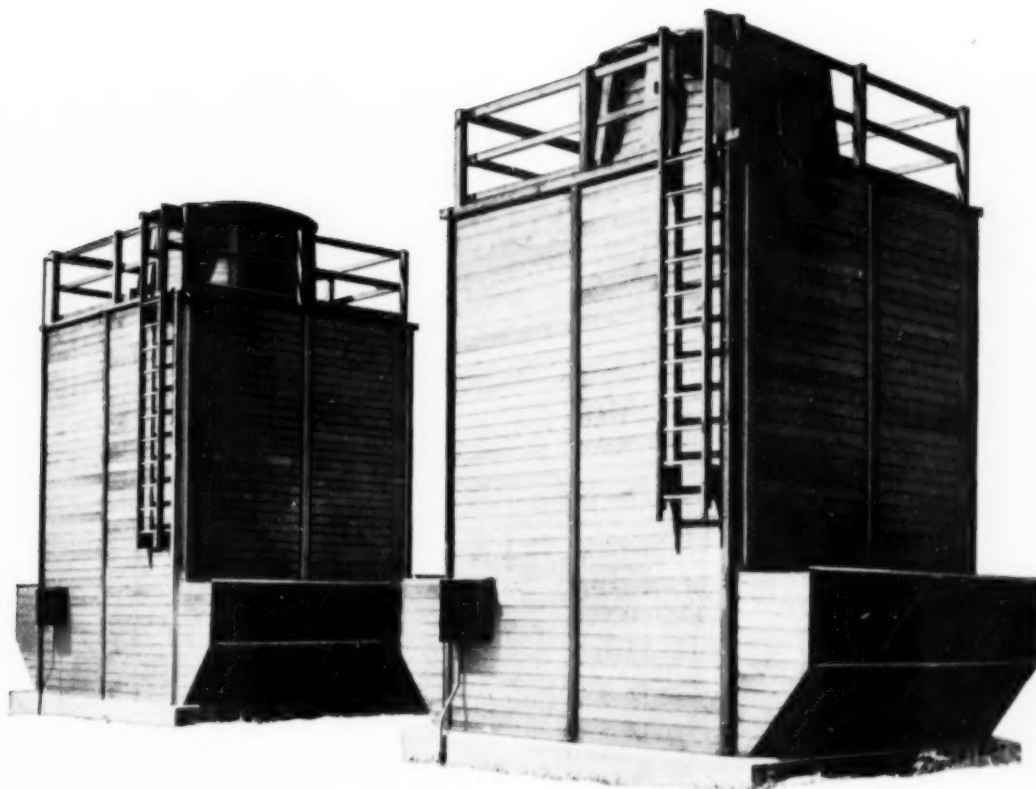
SINCE 1859

GARDNER-DENVER



**THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY**

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 13, Ontario



MORE EFFICIENCY MEANS MORE POWER

Improved efficiency in every detail of the operation of power generating facilities is one answer to the ever-increasing demands for more power.

That's why leaders in the power field choose Pritchard cooling towers. They know that Pritchard heavy-duty towers—like these shown here built for the diesel power plant in Nebraska City, Nebraska—are designed *right* . . . engineered with adequate capacity . . . to do any required cooling job at a minimum operating expense. Consult Pritchard—a founder member of the Cooling Tower Institute—to be sure you get *guaranteed performance . . . maximum efficiency* . . . from your next cooling tower.



Pritchard QUINTAIR Air-Cooled Heat Exchangers

For more efficient . . . more dependable . . . cooling or condensing of liquids, gases or vapors, specify a Pritchard QUINTAIR® air-cooled heat exchanger. Quality construction assures long, trouble-free service . . . skillful design makes all parts that may require attention readily accessible for easy maintenance.

®Registered Trade Name

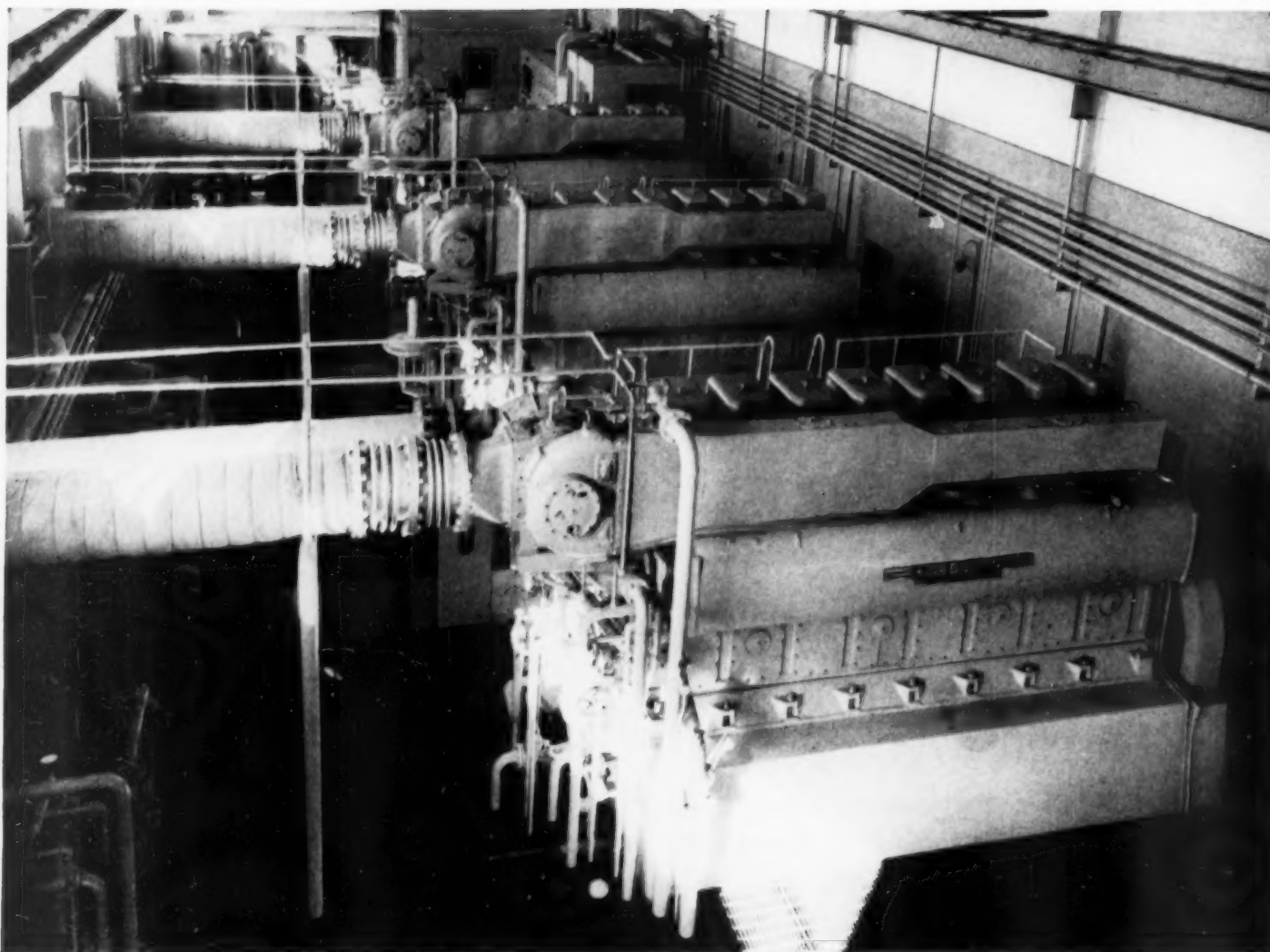
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Representatives in Principal Cities from Coast to Coast



12 Nordberg Supairthermal Engines are installed in four main pumping stations on the Trans Mountain Pipe Line . . . at Edmonton, Edson, Blackpool and Kamloops.

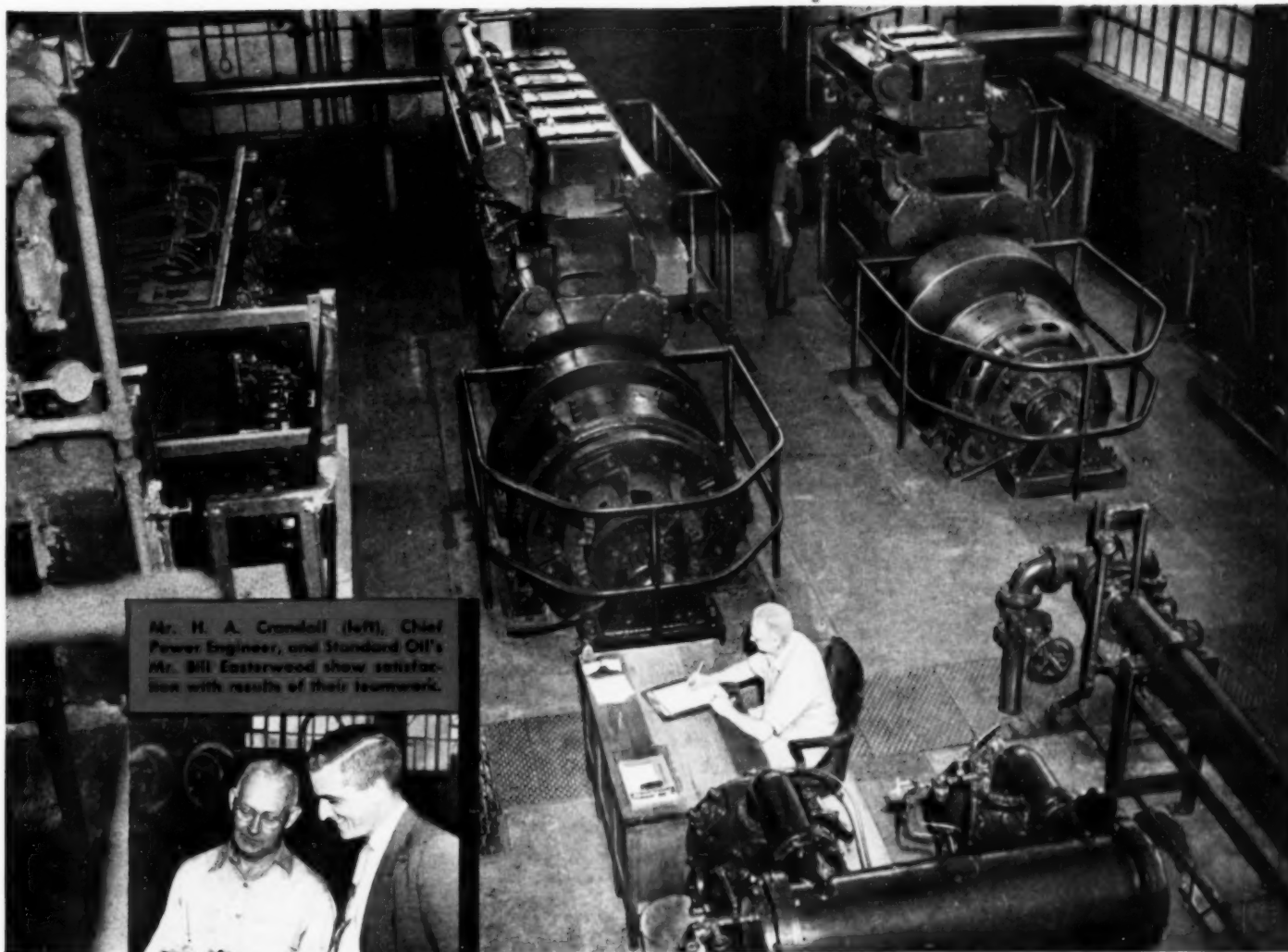
Twelve Nordberg *Supairthermal** Engines supply the "Big Push" for TRANS MOUNTAIN PIPE LINE

Twelve powerful, compact Nordberg *Supairthermal* Engines have been given the tough power assignment of supplying the "big push" of crude oil from Edmonton, Alta., to Vancouver, B.C., for the Trans Mountain Pipe Line Co., Ltd. These engines, totaling over 20,000 horsepower, are installed in four pumping stations along the route . . . and include nine 1780 hp and three 1330 hp units. Three of these are Duafuel® engines, and the balance are Diesels, using crude oil as fuel. § § § This is another outstanding example of the way in which Nordberg *Supairthermal* Engines, in Diesel, Duafuel® and Spark-Ignition Gas types, from 535 to 4260 hp, are being used to provide compact, heavy duty, economical power for the petroleum industry. Nordberg Mfg. Co., Milwaukee, Wisconsin.

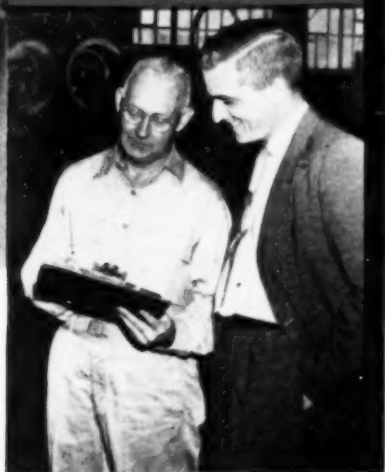


O1153-R

*Trademark



Mr. H. A. Crandall (left), Chief Power Engineer, and Standard Oil's Mr. Bill Easterwood show satisfaction with results of their teamwork.



Here's a 27,000-hour record for low wear and clean operation!

● This diesel power plant serves a large midwest manufacturer of steel products.

The plant superintendent was increasingly aware that lubrication of his two diesels was not all that it should be. There was trouble with stuck rings, and crankcases showed excessive deposits. Working with a Standard Oil lubrication specialist, the superintendent switched his engines to STANDARD HD Oil.

During some 27,000 hours' operation of each unit, engines have remained exceptionally clean. Ring sticking troubles have been eliminated. Cylinders have shown less than 0.01" wear — a reduction of 50% over the previous, similar period. Neither of the original fills of STANDARD HD have needed to be replaced.

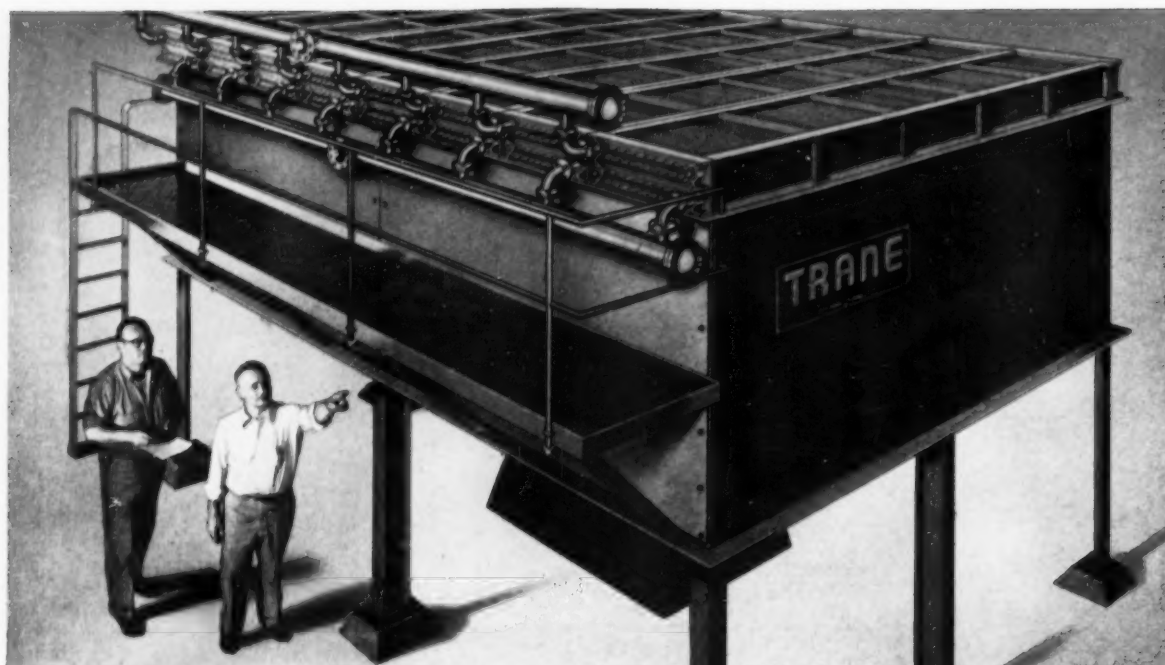
Midwest diesel operators are getting record efficiency and economy with the help of STANDARD HD. Your Standard Oil lubrication specialist can help you get similar results. Phone your local Standard Oil office. Or, write: Standard Oil Company, 910 South Michigan Ave., Chicago 80, Ill.

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(Indiana)

STANDARD OIL COMPANY



TRANE GC Fluid Cooler, fan diameters from 6' to 16'.

5 reasons for specifying TRANE fluid coolers

... and they all add up to fewer shutdowns ... less trouble ... lower operating costs

1. Vibration controlled! TRANE Fluid Coolers wear longer... require less maintenance... because TRANE engineers have virtually eliminated causes of vibration. Fan and motor mounted *independently* of rest of unit, fans dynamically balanced. Solid, oversized fan shaft firmly mounted in giant thrust bearings. Drive components aligned at factory, shipped assembled. Orifice ring designed to *match* the fan.

2. Fin and tube "joined forever." Mechanically bonded to tube, fins can't loosen. No solder is used. Tubes contract and expand independently of casing, reduce strain.

3. Coils resist corrosion. Available in wide variety of metals including cupro nickel, admiralty, red brass, copper, aluminum, monel, stainless steel, special metals, to solve your corrosion problems.

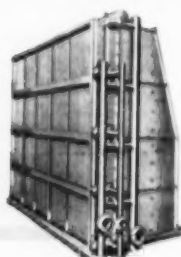
4. Extra strong framework. Unit can be used for station-

ary or portable installations without additional bracing. Stands up under wind and shock load.

5. Automatic controls cut power costs. Automatic controls regulate leaving temperatures down to 2 degrees plus or minus... adjust both motor speed and air shutter openings for most economical operation. And since surveys show most units operate at design temperatures only 10% of time, savings in fan horsepower yield big savings in operating costs.

Get all the facts before you plan your next job.

Contact your nearest TRANE Sales Office or write TRANE, La Crosse, Wis., for Bulletin DS 395, containing capacities, performance curves, construction details, roughing-in dimensions, installation details and specifications.



You can plan on longer "life expectancy" with

TRANE EC Fluid Cooler,
14 sizes, fan diameters
from 18" to 120".

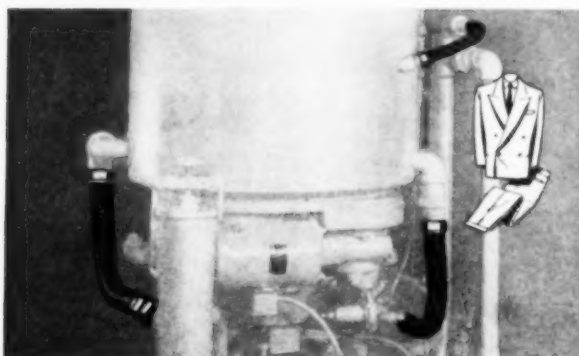
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dry-type fluid coolers

The Trane Company, La Crosse, Wis. • East. Mfg. Div., Scranton, Penn. • Trane Co. of Canada, Ltd., Toronto • 87 U. S. and 14 Canadian Offices.

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

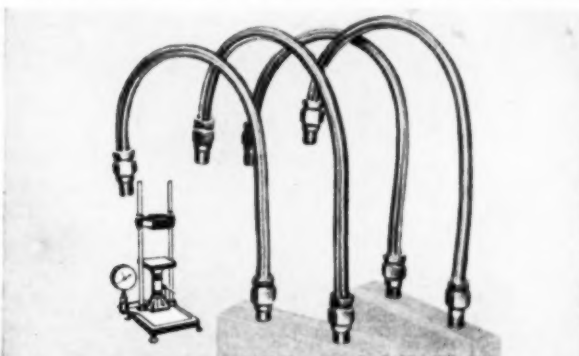
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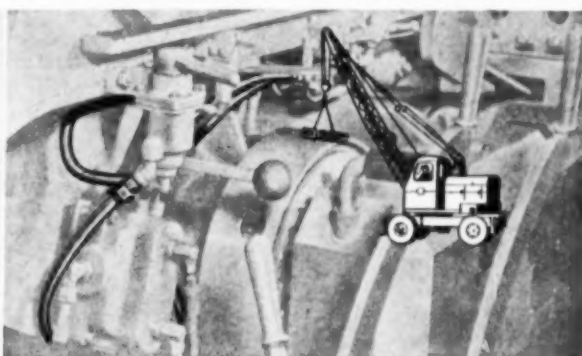
END VIBRATION AND LEAKAGE. Titeflex[®] metal hose, used as fill and drain lines of SEC Synthetic Cleaning Units, kills vibration and prevents solvent leakage at fittings. Tough, wear-and-corrosion-resistant Titeflex is just as effective in handling steam, oil, lubricants, fuels, gases, brine, acids, compressed air or oxygen. Design and construction of Titeflex assure trouble-free performance. Excellent for projects involving extreme configurations.



CONTROL CRITICAL PRESSURES. How would you connect 280 cylinders of fire-extinguishing carbon dioxide at 850 psi to line? Wpfler Kidde & Company licked this problem with Titeflex flexible metal hose which met all insurance standards and withstood rigid application requirements. Titeflex also conveys hundreds of different fluids under as many different temperature and pressure conditions. Resists corrosion, vibration, physical abuse.



CONDUCT STEAM SAFELY. Plates for Carver Laboratory Press carry steam up to 200 psi (nearly 400°F.) for heating—water for cooling. The connections are flexible, pressure-safe Titeflex. Braiding gives extra strength. Added problems of vibration, pulsation, continuous movement, corrosion or abrasion make Titeflex invaluable in scores of other applications.



FIGHT FATIGUE AND WEAR. Titeflex metal hose eliminated maintenance on air control lines of Unit Mobile Cranes. All-metal construction, with braiding woven directly upon the hose, provides great strength and resistance to vibration, corrosion, wear and abuse. Flexibility of Titeflex permits simplified assembly even where space configurations are problems.

THE USES FOR TITEFLEX[®] seamed flexible metal hose and Uniflex seamless flexible metal hose are limited only by engineering ingenuity. And Titeflex design engineers—working *with* customers—develop new applications daily. Somewhere in your plant or on your products Titeflex can improve operation and maintenance—or simplify a design problem. Our new 48-page *Metal Hose Catalog No. 200* shows you how and why. To get your free copy, simply mail the coupon.

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**POSITIVE
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of Health, Efficiency
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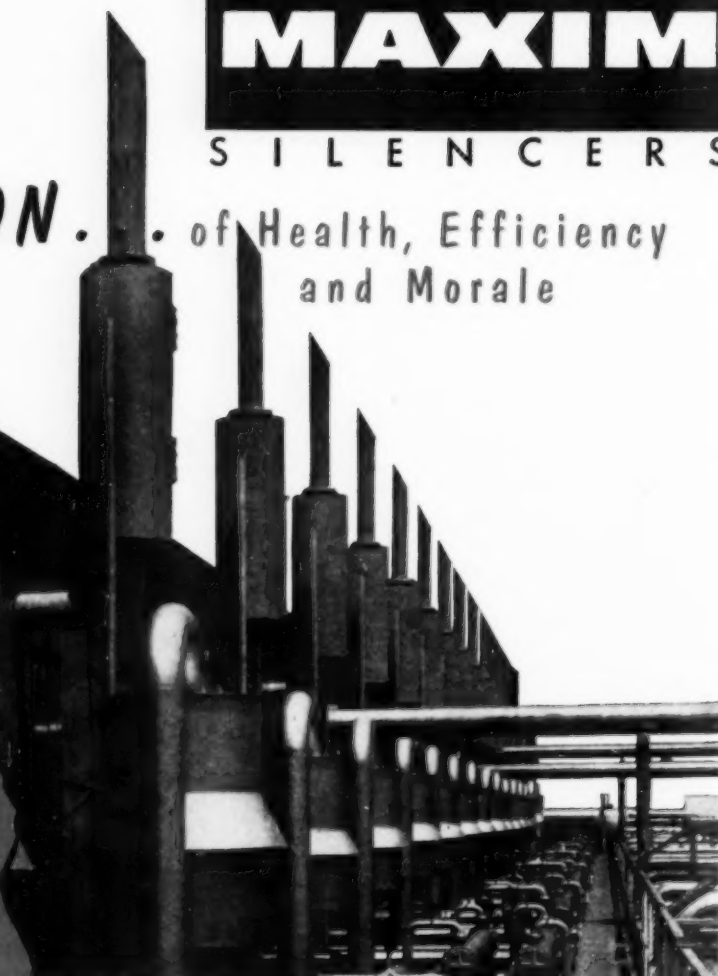


Meet MR. NOISE, above, one of the most destructive and wasteful criminals to be found in industry today. He represents a very serious problem that affects the health, efficiency and morale of your own personnel, as well as others living within earshot of a noisy plant.

If Noise is the by-product of your industrial process, look to Maxim for advice and help.

Maxim has an unequalled record for eliminating Noise in thousands of plants throughout the world. They can do the same for you.

Sketch, above, courtesy of Safety Maintenance and Production.



Maxim Silencers control exhaust noises caused by all types of internal combustion engines; cut noise and vibration on intake of engines or compressors, or wherever steam, air or gas must be exhausted at high velocities. Where extra heat is needed, Maxim Heat Recovery Silencers provide it at no extra cost for fuel by converting exhaust heat into usable steam or hot water. Where fresh water is a problem, Maxim Evaporators can be tied in with Heat Recovery Silencers or engine jacket water to provide efficient distillation.

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"Big Red" Rolls for Ryan



SWIFT SELF-LOADING. A pair of hustling TD-24's charge ahead, self-loading 18 yard scrapers as they go. Five of these fast Internationals helped keep the job ahead of schedule.

Contractor completes job 45 days ahead of estimate as TD-24 fleet moves a million yards

Ryan Construction Company, Evansville, Indiana, took on a big job when they contracted to move a million cubic yards of dirt and place 35,000 tons of riprap in site preparation for a new steam generator plant on the Ohio River.

From the first day on the contract, Ryan's five TD-24's made the dirt fly. Their assignment: to cut down two hills and dump the excavated material in old creek bed to make a new power plant site.

They averaged 4 minutes and 40 seconds on the 2,000 foot round trip between cut and fill. Self-loading heaped scrapers, the Big Red fleet moved tremendous yardages every day—kept doing it even in rain and mud, the Ryan people report.

TD-24's are the fastest and most powerful crawlers on the market. That's why "Big Red" performance is paying off not only for Ryan but for contractors across the country who need big crawler power to get tough jobs done on time.

And you can't beat the service provided by your nearby International Industrial Distributor. His trained servicemen, complete stocks of parts and up-to-date shop facilities are available to you anywhere, anytime to keep your equipment in production.

He and the famous line of IH crawlers he sells are willing and able to help you put your contract on a paying basis.

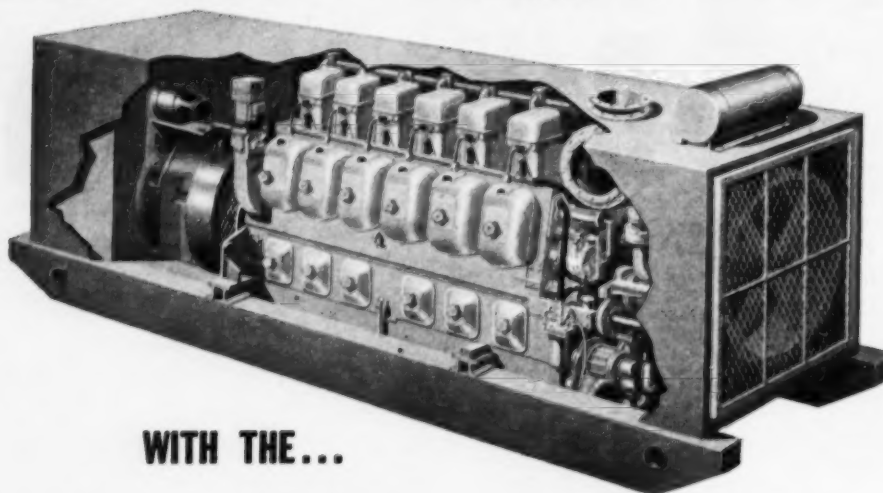
INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL



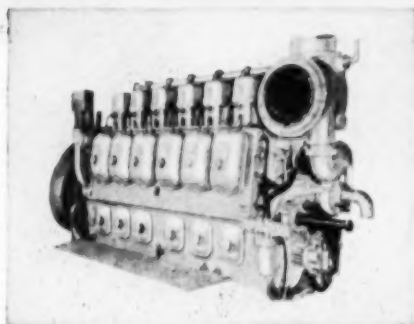
POWER THAT PAYS

DEPENDABLE POWER
WHERE YOU WANT IT, WHEN YOU WANT IT



WITH THE...

NEW, PORTABLE ALCO DIESEL ELECTRIC GENERATOR UNIT



Alco 6-cylinder, 9" x 10 1/2" (251-A), 4-cycle, turbo-charged diesel engine, dry weight 21,350 lbs. Twelve- and 16-cylinder engines, also available.

for

- ★ Emergency power generation
- ★ Power during construction or repair
- ★ Supplemental power during peak periods
- ★ Hospital or civil defense standby service
- ★ Scores of other municipal and industrial uses

Here's the answer to your demand for a compact, economical power generating unit for emergency, temporary or standby service.

A completely self-sufficient power plant, the new, portable Alco Diesel Electric Generator unit consists of a 9" x 10 1/2", 4-cycle turbocharged Alco diesel engine, in sizes ranging from 390 to 1300 kw, with all necessary auxiliary equipment.

It can be rail-mounted for electric power *where* you want it, *when* you want it. It can be installed

permanently for applications such as standby service in hospitals and municipal power plants.

Either way, it puts dependable power at your immediate call twenty-four hours a day.

Let us tell you more about this versatile new unit in terms of your own operations. Write or phone your nearest Alco sales representative today for complete information. Offices in New York, Beaumont, Chicago, Cleveland, Houston, Kansas City, San Francisco, Schenectady and St. Louis.

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HYDRAULIC GOVERNORS

regulate the engines
in hundreds of work boats



Four of 24 tugs owned by
Great Lakes Towing Co.



Four of the six tugs placed in oper-
ation by Lehigh Valley Railroad
during the last four years.



Five of the six new tugs in the harbor
fleet of the Erie Railroad Co.

The **Marquette**
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INSTANT HIGH PRESSURE OIL FIELD PUMPING MACHINERY

Tons of STEEL... Forged and Machined to Exacting Specifications at ERIE FORGE!



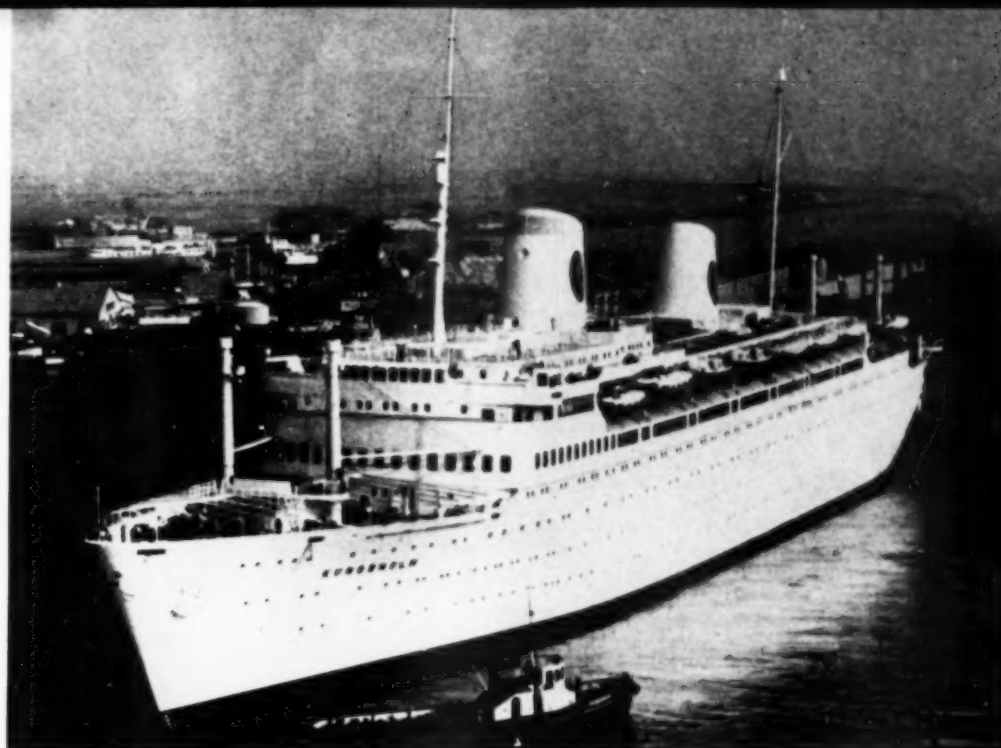
THE main press cylinder here illustrated is a part of a huge extrusion press for the Air Force. Some of these presses are rated at 50,000 tons. This forging was produced from ingot to finished job here at Erie Forge & Steel Corporation. Extremely close tolerances were required on the finished part with particular attention being paid to the polished finish on the interior walls. Expert craftsmen performed every operation here in our plant . . . one control, one responsibility. We are specialists in producing steel forgings—all shapes and sizes. Consult with Erie Forge on your next forging requirements.



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The dieselized liner, *Kungsholm*, as she arrived in the port of Flushing, Holland. The ship is 600



ft. in length and has a beam of 77 ft. Her gross tonnage is 22,000.

M/V KUNGSHOLM

The *Kungsholm*, Scandinavia's Newest Luxury Liner, Is Powered by Two Diesel Engines

THE motor vessel *Kungsholm*, Scandinavia's largest luxury liner arrived in New York harbor December 3rd from Gothenburg. On February 6th, she will leave New York for a 55-day cruise around South America. The vessel was built by the De Schelde Shipyard in Flushing, Holland. Her keel was laid January 20, 1951 and was launched October 18, 1952.

The *Kungsholm* has a length of 600 ft. overall and a maximum beam of 77 ft. and is of 22,000 gross register tons. She is a twin screw ship with the main propulsion by two 8-cylinder, 2-cycle, single-acting, direct-coupled crosshead diesel engines de-

veloping normally 17,500 ihp. The engines were manufactured by Burmeister & Wain of Copenhagen, Denmark. Test runs were made in November 1952 but the exact speed of the *Kungsholm* had not been officially released. However, it was estimated at about 19 knots.

This latest addition to the Swedish American Line fleet provides a new high in luxurious accommodations in passenger vessels. It has a total capacity of 800 in trans-Atlantic runs. Among its features are two swimming pools, complete air conditioning, a movie theatre, telephones in every stateroom, a gymnasium and steam baths.

The master of the new *Kungsholm* is Captain John Nordlander, who has been Captain of the *Stockholm* since 1948.

The Swedish American Line currently operates in addition to the *Kungsholm*, two trans-Atlantic motor liners, the M/S *Gripsholm* and the M/S *Stockholm*. The *Gripsholm* is well-known as the "Mercy Ship" during the war, when, under charter to the United States Government she was engaged in the exchange and transfer of diplomats, the sick and the wounded. The Swedish American Line also operates a fleet of some twenty freighters, all of which are also powered by diesels.



The *Kungsholm*'s arrival in Gothenburg, October 11, 1953. The vessel's power plant consists of two giant Burmeister &

Wain diesels developing normally 17,500 ihp. to drive the ship at an estimated 19 knots.

FEBRUARY 1954

25



An old burn in Western Oregon being cleared of snags by an Allis-Chalmers bulldozer using a General Motors diesel. Air spraying the area adjacent with diesel oil and DDT helps to control spruce budworm.

DIESELS HELP HARVEST TREES

By F. HAL HIGGINS

HUMBOLDT County wants to always log, farm and live in perpetual prosperity. There is one great lumbering county in the U. S. that is sizing up its great wealth in trees—trees that were

harvested so rapidly in the past 12 years of war and trees to meet the post-war demands for wood in construction. Humboldt county, up the Pacific Coast, only one county from the Oregon line, has

decided it is time to begin to see both forest and trees before they find it is later than they had thought in shifting from the old virgin forest era to the treeless cut-over stage with wood industries gone—and with it prosperity—beauty—and tax revenues to support a modern U. S. standard of living.

The hero of the piece is an old friend and acquaintance of the writer, County Advisor W. D. Pine. Pine has been on the job advising and leading his county farmers for a long time. In fact, he has handled Del Norte and Humboldt county farm matters as advisor for both, where farming is pretty much identical and a mere side show to the big overshadowing logging industry that has been important for a quarter of a century. Dairying, sheep, poultry and a war boom in lily bulbs, plus small farming and poultry raising, etc., covers the limited agriculture. Scarcely 27,000 acres are under cultivation, though farm income was up to over \$15 million last year. Farmers here as was the case clear across the U. S. in the pioneer days traditionally think of trees as something to cut down, their stumps grubbed out and crops of grain, hay, fruit and vegetables replacing them. Hence, they never gave a thought to an annual income from trees growing over the years, on that land they wanted for crops. For one thing, the trees weren't worth much before the days of railroads and big cities and the wars and growing populations that demand so much more timber.

So, the writer dropped in on County Advisor Pine when he got to Eureka recently and asked him what about this story of his getting a national reputation for adding trees to his county's farm crops. "Well, we have been getting around to readjusting our sights on the timber that covers a lot of good farm land," replied Pine. "Fir was of no commercial value till the 1940's. To our range land owners a ranch was of little value because it was mostly trees



Logging truck uses a Cummins diesel to carry the heavy load in Western Oregon. Bucyrus-Erie shovel is equipped with air-tongs for loading logs.

Harvesting redwood and fir, yarder, loader and truck all use Cummins diesels; and stationary equipment and trucks use Twin Disc torque converters. Note that young trees are left to grow and mature for future harvesting.



and brush. In the early '40s, outside capital began buying some fir on range lands and paid the unheard of price of 50 cents a thousand board feet for the best timber in the stand. Prices went up to \$1, then to \$2.50, and finally a peak of \$20 was reached. Range land owners were getting rid of their fir and attempting to convert the logged-off land to agriculture. Stumpage prices were rising and loggers were beginning to go back to harvesting timber left that hadn't been of sufficient value to warrant harvesting the first time. California always permitted, if the land was declared to be used for farming after logging, all trees to be cut and nothing left but brush and debris. This was followed by fire to make way for agriculture. In many instances the law was used to sell the timber when the land was not to be used for farming. This situation prevailed until the spring of 1952. The Agricultural Extension Service began to have inquiries for advice on forestry range lands. We had worked with cooperators for many years on seeding burned-over areas. We knew little of forestry practices, however. Range land owners were beginning to ask: 'Are we making a mistake with the present economic situation of timber in converting our timber land to agriculture?' Also, 'what will be the effect on property taxes after the present economic bubble bursts?' We were asked to make a survey. The county budget provided a fund and permission came from the University of California, College of Agriculture Extension Service. After a 2-months survey of many people, commercial concerns and public officials, I submitted my report, not as a forester, but as a Farm Advisor. Humboldt county would be fortunate if all its citizens could realize the great wealth of natural resources it has within its borders by adopting good forest practices and preparing for a bright and permanent future which will surely follow."

In Pine's 24-page report titled, "Humboldt's Tim-



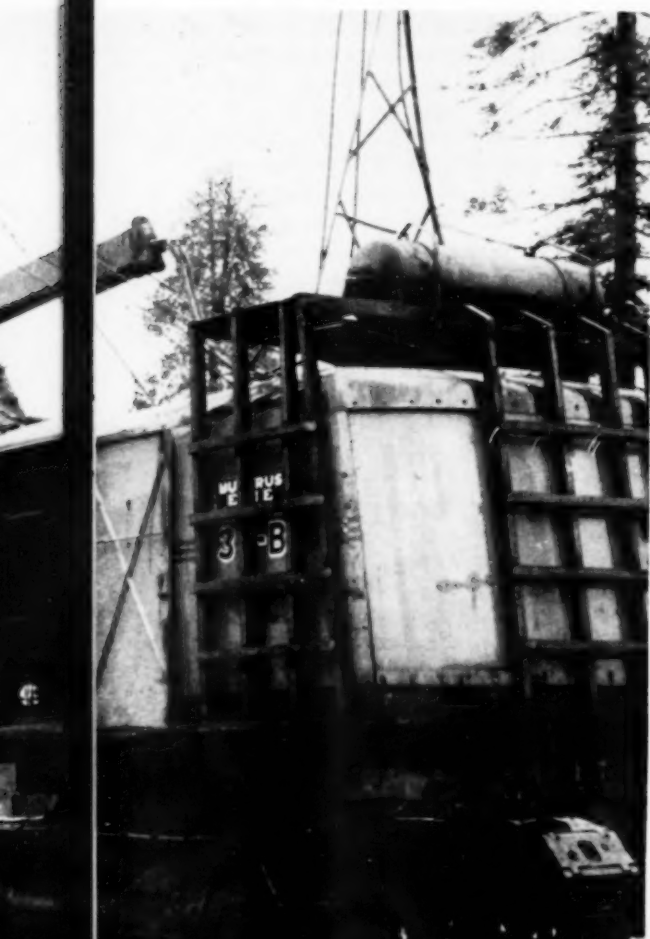
General Motors diesel and Allis-Chalmers equipment help rebuild burned area in Oregon's program of planning a perpetual logging industry.

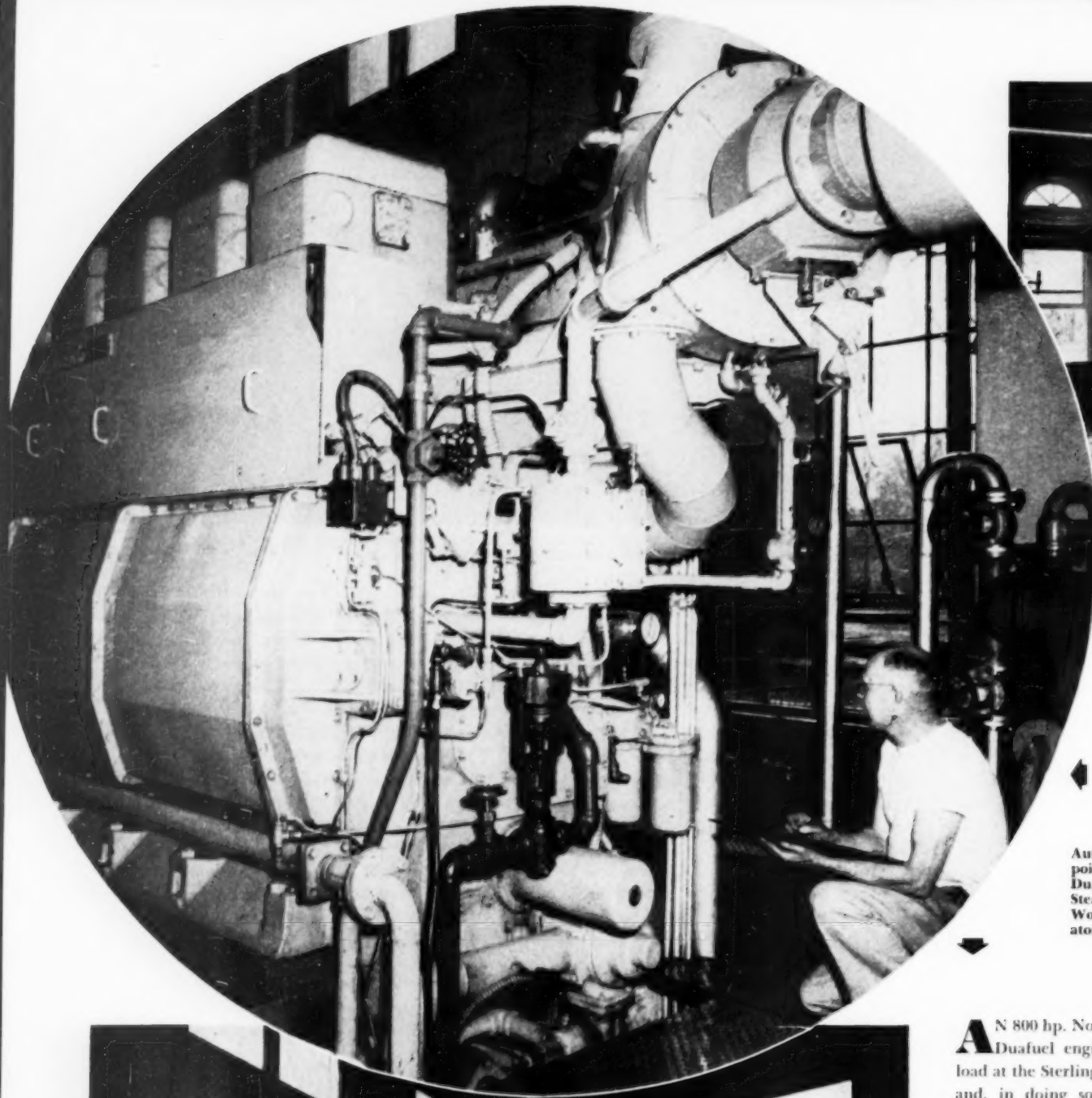
ber, a Present and Future Problem," he summarized the story in ten points: 1. The County Board of Supervisors set up funds for the survey as a result of the feeling of timber-owning livestock ranchers that first hand information should be obtained on the best methods of handling ranch timber lands as between clearing them or leaving them in timber production. 2. Pine made a first hand investigation in Oregon, Washington, Great Lake states and the Southeast among foresters, lumber and livestock men. 3. Evidence gathered proved over development of forest cutting brought distress to many areas, in some sections continuing to the present. 4. What has happened in those areas could well happen in Humboldt. 5. Lumbering was increased so rapidly in other sections—with no steps taken to replace forest growth—that the industry had to close down and move out. This trend has resulted in the concentration in Humboldt, Del Norte and Mendocino counties. 6. In many sections tree farming is very active, mostly on second growth. This program deserves public recognition and support. 7. Where ranchers own timber, they had found that some of their forest land should not be cleared from trees to grass, while other forest land may be safely converted. Agriculturalists, foresters and soil specialists advice brought these conclusions. 8. Better forest management follows the bringing in of waste, utilizing industries like pulp mills, chemical plants, hardboard mills because of the close utilization possible. 9. Humboldt county has been spared the traditional distress that follows logging off of its lands seen in other states. Old growth plus favoring climate and soil for rapid tree growth insures this area if program is started. 10. Recommending a forestry committee of local citizens be set up by the Board of Supervisors to review the Pine report and findings and to then make plans for Humboldt's future permanence.

Pine's report has rocketed his name into national and even international prominence since copies of it trickled out to government agencies, logging editors and conservationists with timber knowledge. Pine has his Humboldt citizens committee in a 17-man group called the Humboldt County Forestry Committee. It is already studying the heavy cutting of timber that got rolling with war and post-war demands for lumber. The committee has already

called on the University of California School of Forestry to prepare a factual data report upon which the committee will then base its own findings and recommendations. Pine's committee is but one of several organizations interested in and working on the same problem. Redwood Region Conservation Council is an industry-supported organization to promote better understanding of forests and forest industries and their relation to the local welfare. The Redwood Region Logging Conference is an independent organization of loggers working for the improvement of forest and logging practices in the redwood and Douglas forests of northwest California. Its annual conventions have been high points in mechanizing and dieselizing logging methods in the past fifteen years. The Tree Farm program is sponsored and administered by the California Redwood Association to promote interest in perpetual forest production. It has already certified over 109,000 acres of timber. Sign boards on timberlands that bear the certified sign are signs of good management of forest. High school and state college forestry courses have been launched at four high schools in the Redwood area and Humboldt State College at Eureka. Four H Club forestry projects are being set up by the College of Agricultural industry. A state forest practices act was passed in 1945 and sets up forest practice rules in each of the four state forest districts. The Small Woodlands Council was set up last year to aid the small owner.

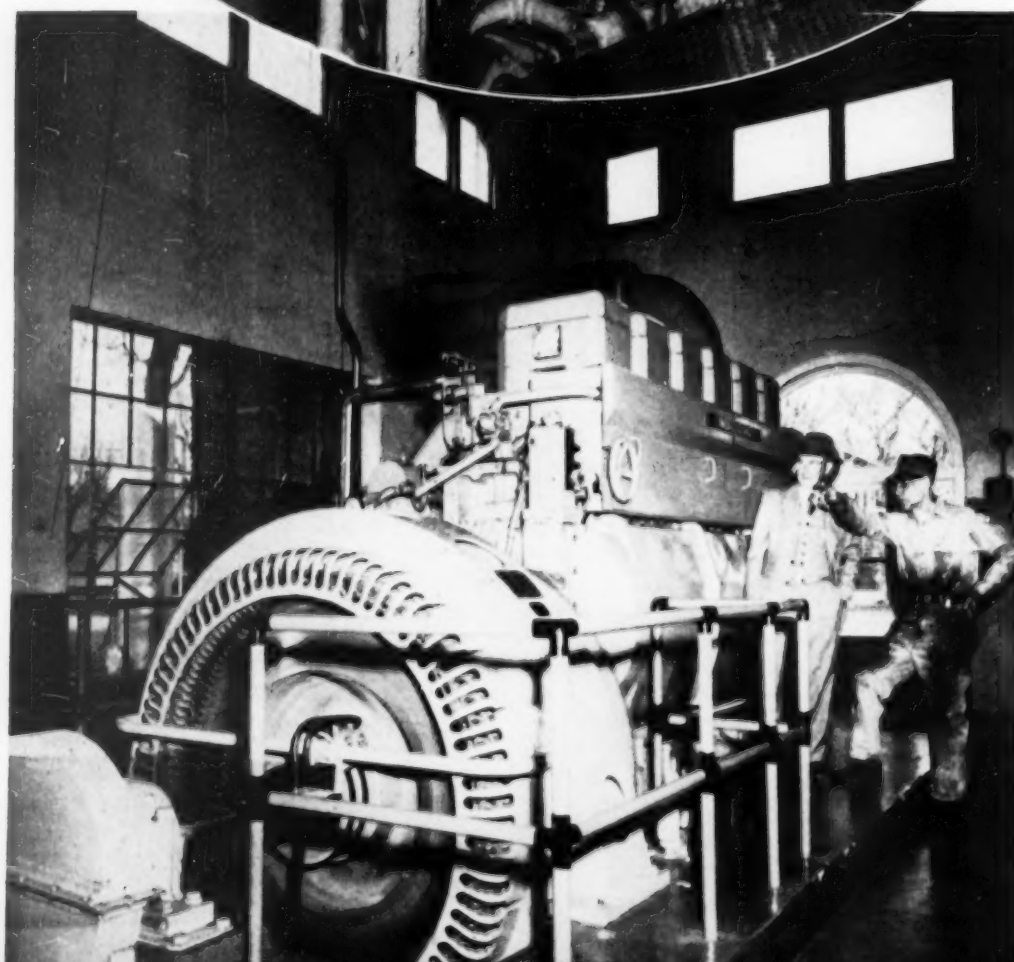
High school students have their Junior Logging Conference that is patterned after the Redwood Region Logging Conference that has done so much to educate the big-logging operators in the most modern practices, especially in mechanization trends and machines. The high school students hold a 3-day session in the woods to acquaint themselves with sound forest practices. Then, finally, there is the old Save-the-Redwood League, which has been a potent influence in collecting money for purchase of outstanding forests of redwood over the years. All have their place in focusing attention of the public over the problem of harvesting trees for lumber in a manner to make it a perpetual industry for the benefit of the Lumber Industry, Labor, Agriculture, Finance, Government, Transportation, Tourist, and, in fact, every interested element and group which is, practically, the public at large.





The Nordberg 800 hp. Dualfuel engine which has cut fuel cost per kwh. 47 per cent. This view shows the Elliott turbocharger, Nugent Duplex oil filters, Viking alarms, and Fulton-Sylphon thermostatic valves.

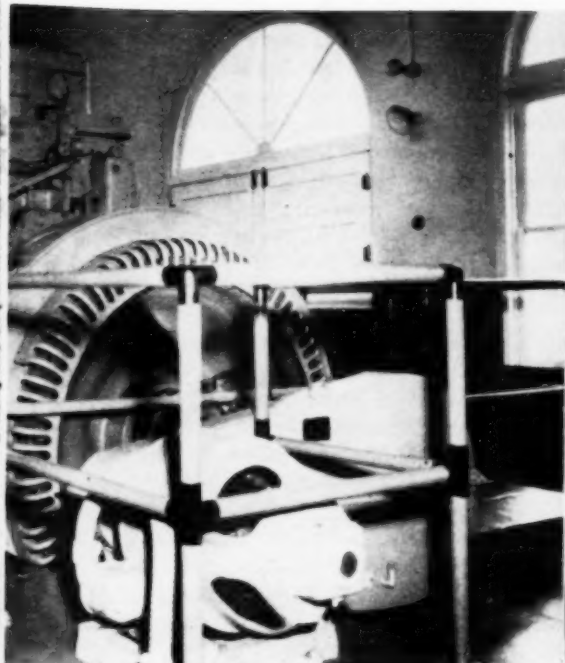
Author, Chief Engineer Andy Fabin points out features of the Nordberg Dualfuel engine to City Manager Fred Stearns. Visible in this view are the Woodward governor and the GE generator with Link-Belt chain-driven exciter.



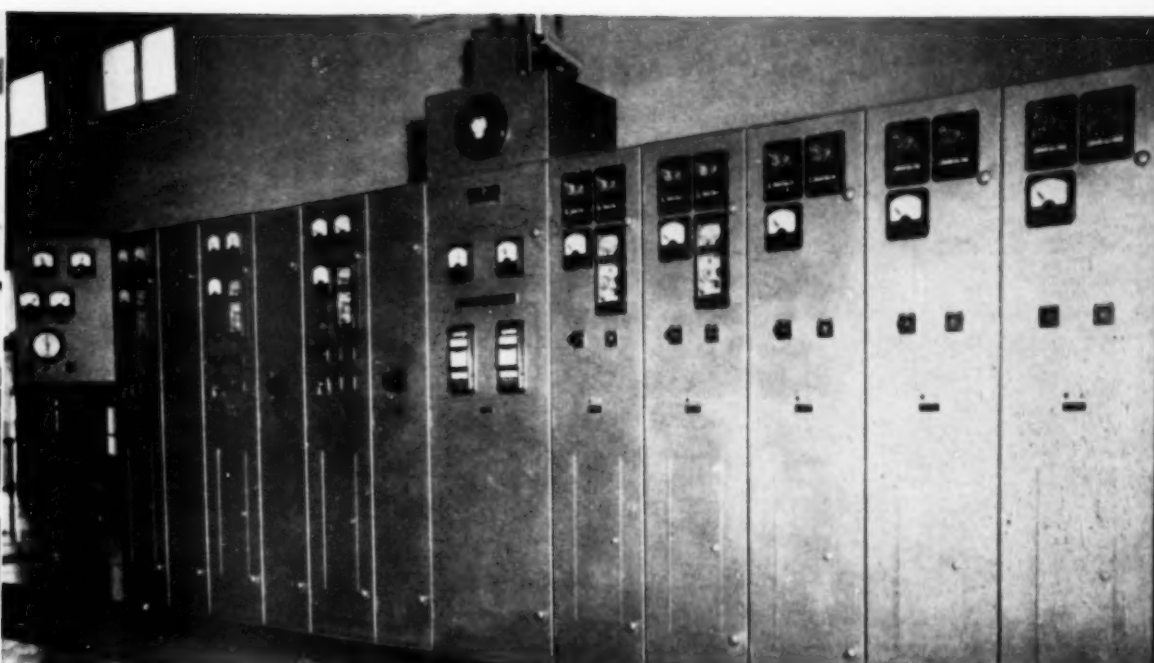
AN 800 hp. Nordberg Intercooled-Supercharged Dualfuel engine is carrying the bulk of the load at the Sterling, Kansas Municipal Power Plant and, in doing so, is rolling up some excellent service records. The engine was put into service on August 16, 1951, and during the rest of that year ran 72 per cent of the time. After this break-in period, the unit got into stride and operated 7,532 hours in 1952, about 86 per cent of the time. Finally, in 1953, the engine really got down to business and has run (at this writing) more than 96 per cent of the elapsed time. From this it is obvious that the Nordberg is shut down only for routine maintenance. The reasons for continuous operation of the new engine can be seen in an analysis of fuel consumption and operating costs. In 1950, with oil-burning diesels carrying the entire load, the cost of fuel per kilowatt-hour was 6.1 mills. In 1951, the Dualfuel engine operated four months and produced about 23 per cent of the year's total generation; fuel cost per kilowatt-hour dropped to 5.7 mills. In 1952, with the Dualfuel unit generating 82 per cent of the plant total, the plant average fuel cost per kilowatt-hour dropped to 4.3 mills.

In the year 1952, the newest engine produced 2,381,330 kilowatt-hours and consumed 24,723,200 cu. ft. of natural gas and 20,830 gal. of pilot oil.

*Chief Engineer, Municipal Power Plant, Sterling, Kansas.



The 800 hp. Nordberg has been the mainstay of the Sterling, Kansas generating plant since its installation in 1951. The 550 kw. generator is General Electric. Metal hose is Chicago Flexible Hose.



The Sterling plant is served by this dead-front, unit-type General Electric switchboard with electrically operated switch gear.

STERLING, KANSAS

By ANDY FABIN*

This meant an average consumption of 10.3 cu. ft. and .0083 gal. of oil per kilowatt-hour. This was achieved at an average load under 60 per cent and with gas that varies from 800 to 1,000 btu. per cu. ft. In terms of cost, the Duafuel performance was as follows:

| | |
|------------------------|-----------|
| Cost gas per kw. hr. | \$0.00236 |
| Cost oil per kw. hr. | 0.00089 |
| | ----- |
| Total fuel per kw. hr. | \$0.00325 |

Average price for natural gas during the year was \$0.23 per mcf. and pilot oil cost an average of \$0.107 cents a gallon. Compared with the fuel cost per kwh. in 1950, the Duafuel engine is producing power at a saving of 47 per cent.

Sterling has had long experience in the operation of a municipal power plant. The first plant that provided electricity to the town was constructed by private citizens in 1899 and was purchased by the city in 1916. At that time, the prime movers were one 100 hp. steam engine and a 60 hp. oil engine. The city installed two 175 hp. uniflow steam engines and then in 1928 switched to internal combustion with the installation of a 400 hp. De LaVergne diesel. A 750 hp. De LaVergne was purchased in 1931 and then, after removal of all steam equipment, the plant's biggest engine was installed,

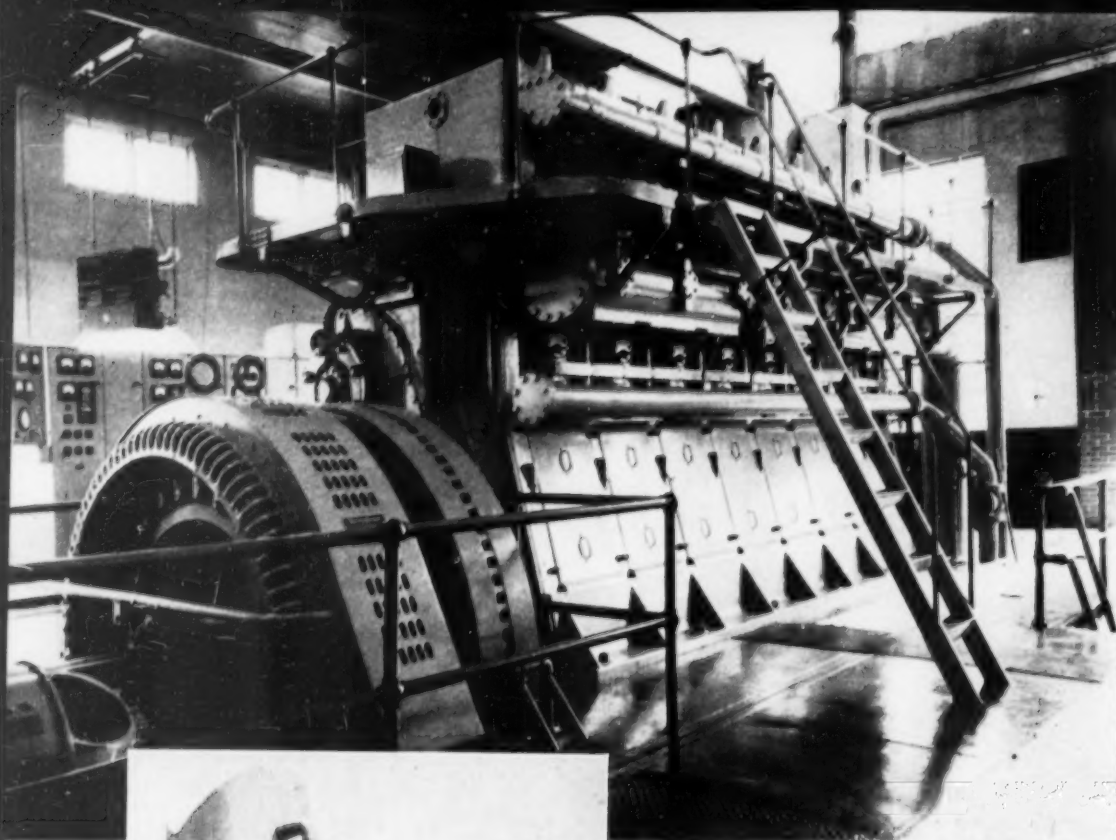
a 1,000 hp. Busch-Sulzer diesel which went into service in 1940. For more than a decade, the Busch-Sulzer Engine was the mainstay of the plant and remains today an important factor in the city's power picture. But high fuel prices dictated the acquisition of a prime mover equipped to burn economical natural gas. The Nordberg engine purchased in 1951 is of the Duafuel type rated 800 hp. at 400 rpm. It is a four-cycle six cylinder engine of 13 in. bore and 16½ in. stroke with intercooler and exhaust-driven turbocharger. The engine drives directly a 555 kw. General Electric generator with chain-driven exciter.

A good quality fuel oil is purchased in tank car lots and is pumped ¾ of a mile from the Santa Fe tracks through the city's own 4 in. line to a pair of 17,000 gal. steel tanks. From storage, the oil is pumped through a meter and a cellulose-packed purifier to elevated day tanks in the engine room, then by gravity to the engine-driven supply pumps and through duplex filters to the fuel injection pumps. The natural gas reaches the plant at 22 psi. and passes through a meter, a scrubber and a pressure regulator to reach the engine at 14 psi. The governor and other fuel system controls are arranged so that the Nordberg engine switches instantly to full oil operation if gas pressure fails. If pilot fuel or lubricating oil pressure fails, the gas supply is cut off automatically and the engine is

taken off the line at the switchboard. An added operating aid and safety device is a gauge and alarm panel near the engine. The alarm warns of low water, lube or gas pressure and of high water temperature. The board also holds a multipoint exhaust pyrometer.

Lubricating oil is bypassed continuously from the engine's pressure system through an oil purifier with fuller's earth cartridges and then returned to the crankcase. The oil is never changed and both oil and engine stay clean. Filtration elements are changed only after 1,500 engine-hours. Lube oil economy has been good. In 1952, the Duafuel engine required addition of only 631 gal. of lube in operating 7,532 hours, an average of 9,549 rated horsepower-hours per gal. of lube. After the first 9,000 hours, pistons were pulled and the engine checked thoroughly. The engine was found in perfect condition. Rings were free and there was no measurable wear in either cylinders or bearings. Not a single part required replacement so the operators just ground the valves and put the engine back into service. Absence of wear at the 9,000-hour check indicates that lubrication was fully adequate. Included in the lube system is an oil cooler and a motor-driven auxiliary lube pump.

Soft water is picked up from the hot well by the motor-driven jacket water pumps and is then



Largest engine in the plant is this 1000 hp. Busch-Sulzer diesel which has been in service since 1940.

forced through the coils in the cooling tower and engine intake air intercooler. This water is used at as low a temperature as possible through the intercooler to reduce the air temperature to approximately 100° F. After the water leaves the air intercooler it is blended with recirculated jacket water to raise its temperature to the normal operating range. This blending is done by means of a thermostatic regulating valve with the control bulk located in the engine jacket water discharge pipe and a separate motor-driven recirculating pump operating in the by-pass line. Use of the intake air intercooler permits efficient operation of the Nordberg

Natural gas for the Nordberg Dualfuel engine passes through an Emco meter and scrubber.

Lubricating oil for the Nordberg is cleaned continuously by a Honan Crane purifier and cooled in a Ross oil cooler. Fan under cooler draws warm air from Maxim exhaust silencer chamber to heat the plant in cold weather.

engine at full load at ambient air temperature above 90° F. Engine air is drawn through an oil bath filter outside the plant and is forced by the exhaust-driven turbocharger through the intercooler to the cylinders. The intercooler using 100° F. water reduces air inlet temperature and makes it possible to pack more oxygen into the cylinders. Exhaust gases vent through the turbocharger and a vertical silencer in a brick housing outside the building. In winter, a motor-driven fan draws warm air from the silencer chamber to heat the plant.

Load development has not been spectacular but it has been steady and sound. Sterling is a farming community of 2,200 population with 720 residential customers, 136 commercial, 25 power, and 82 farm users on the city's own rural lines. The load is well-balanced and profitable. Grain elevators, irrigation pumps, an ice cream plant and laundry are the principal small power users. Increase in consumption of electricity has come primarily from the growing use of electric washers, ranges and air conditioning in a prosperous community.

Municipal operations run smoothly both at the plant which the author has operated for 28 years and at the City Hall where City Manager Fred M. Stearns recently took office. City Clerk G. C. Newby handles the books and finances. Policy matters are decided in consultation with Mayor E. Kenneth Horton and Commissioners Oliver C. Frick and Henry E. Marrs. The plant was designed during the administration of former City Manager J. LaDeux by A. C. Kirkwood, consulting engineer, Kansas City. Civic management is sound and conservative with flashes of inspiration that get the citizen more for his money. For example, Sterling bought land for a park, created a lake on the property, all for a total investment of \$1,500. A site was chosen that would permit formation of a natural lake by removal of sand. The sand was pumped out and sold for nearly enough to pay for the entire project. The investment at the power plant is even better for its pays a substantial profit to the city year after year. Dualfuel economy raised the plant's operating profit in 1952 to \$18,000.

List of Equipment

Engine—800-hp., 6-cylinder, 13 in. x 16½ in., 400 rpm., 4-cycle, intercooled, turbocharged, Dualfuel. Nordberg.

Generator—General Electric.

Governor—Woodward.

Lubricating oil—Standard Oil Co. (Indiana.)

Lube purifier—Honan-Crane.

Lube strainer—Purolator.

Lube cooler—Ross Heater.

Auxiliary lube pump—Geo. D. Roper.

Fuel oil—Standard Oil Co. (Indiana.)

Fuel purifier—Honan-Crane.

Fuel filter—Nugent.

Fuel injection pumps—Bendix Scintilla.

Gas meter—Emco. Rockwell Mfg. Co.

Cooling tower—Marley.

Air filter—Air-Maze.

Turbocharger—Elliott.

Exhaust silencer—Maxim.

Exhaust pyrometer—Alnor. Illinois Testing Labs.

Alarm system—Viking.

Air compressor—Ingersoll Rand.

Switchboard—General Electric.

THE "HOLY FAMILY"

**New Fairbanks-Morse Opposed-Piston Engine,
First of Its Kind, Gives Fishing Vessel 20% More
Speed, 32% More Fish Capacity**

REPOWERED with a small opposed piston Fairbanks-Morse marine diesel, first of its kind to see actual service, the 94-foot dragger *Holy Family* has become one of the fastest fishing boats of her size operating out of Gloucester, Mass. The engine was described at length in the May 1953 issue of *DIESEL PROGRESS*. Before February 1953, when the new engine received its first test at sea, the vessel had been described by her owners as "the second slowest fishing vessel in the port." Today she is not only 20 percent faster but can carry 32 percent more fish per trip and is returning bigger profits to owners and crew alike. Since the *Holy Family* is the first commercial vessel of any kind to employ the small OP, an engine specifically developed by Fairbanks-Morse for boats too small to take advantage of the larger OP's operating efficiency and economy, her performance under actual service conditions is of particular significance to marine men everywhere.

The new Model 38F5¼ diesel, a smaller version of the time-tested big OP, has a 5¼-in. bore and 7¼-in. stroke and is manufactured in sizes from 225 to 750 hp. The engine on the *Holy Family* is a 7-cylinder unit rated at 525 hp. at 1200 rpm. and

455 hp. at 1100 rpm. for dragger service. Although it provides 42 percent more power, the new engine is only half as long and less than half the weight of the 320-hp. diesel it replaced in the *Holy Family*. The extremely compact design of the new heavy-duty diesel has made it possible to increase the vessel's total cargo carrying capacity from 125,000 lb. to 165,000 lb. The engine is a complete packaged marine unit equipped with air-actuated remote controls, heat exchanger, lube cooler, air compressor, pumps and filters. It drives through reverse-reduction gears and has a forward end power take-off with clutch to drive generator and winch.

The greater horsepower and speed achieved with the new engine enable the *Holy Family* to fish in rougher weather, to reach her fishing grounds faster, drag her nets at a higher speed and return to market with a full load of fish in a much shorter period of time. By reducing the number of days at sea in this way, the vessel has cut fuel consumption to the point where she burns no more per trip at 445 hp. than she did before at 320 hp. The vessel's fuel capacity enables her to stay out for more than 16 days without refueling. On her most recently completed trip before this writing, for ex-

ample, she stayed out for a total of 14 days, an unusually long trip marked by frequent storms.

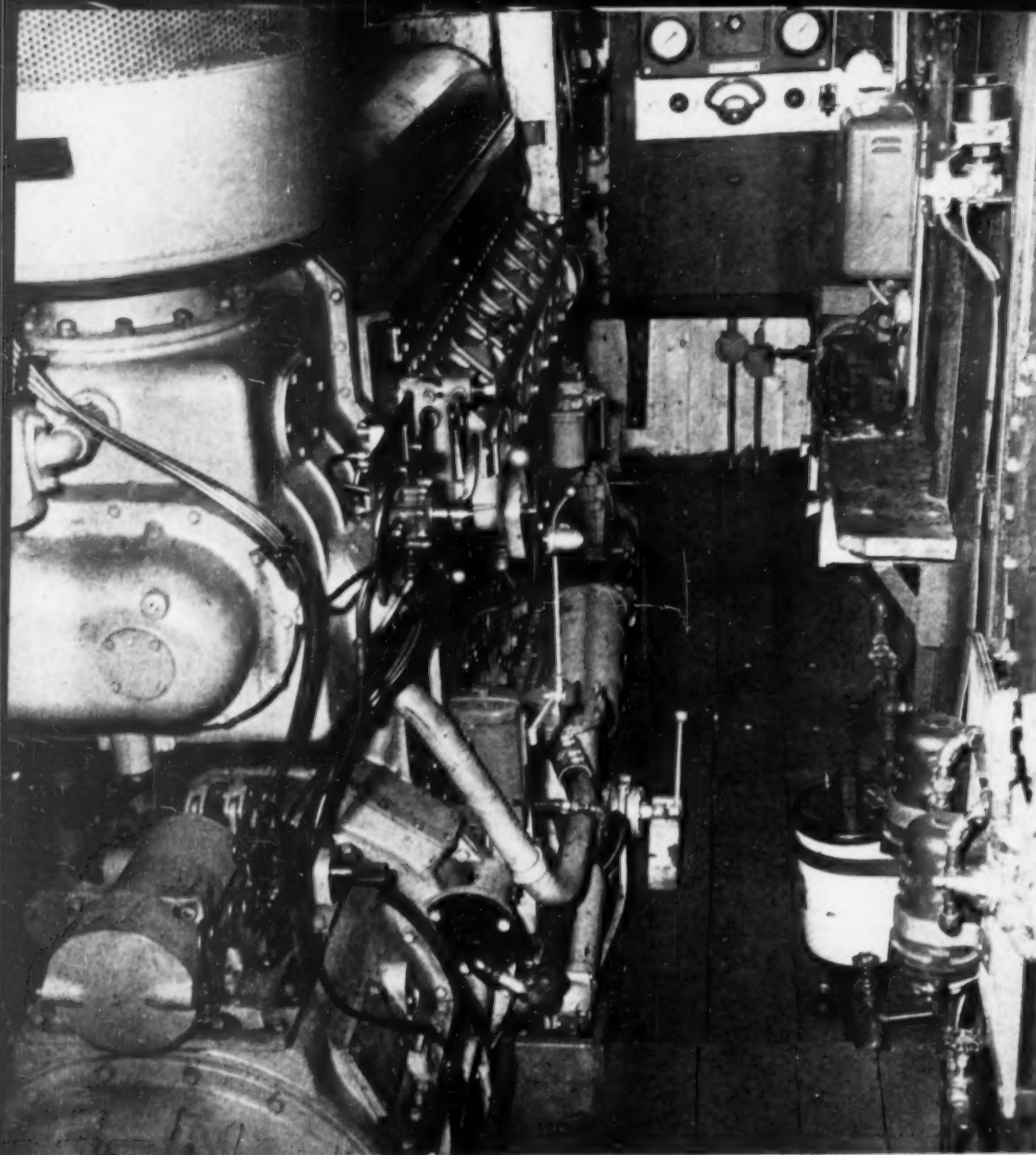
In 304 hours of continuous operation, the new OP engine consumed a total of only 5,624 gallons of fuel oil, burning it at a rate of 18½ gallons per hour. According to Chief Engineer Sebastian Mocerri, most Gloucester fishing boats of the same size, although generally powered by engines of about 350 hp., consume fuel at the rate of 20-22 gallons an hour, 12 percent above the *Holy Family*'s economy rating. On the same trip, the vessel consumed a total of only 25 gallons of lube oil, better than 5500 rated hp. hr. per gallon.

Depending on fishing conditions, the *Holy Family* averages between 7 and 14 days a trip, bringing in a full load days faster than was possible with the old engine. The captain and crew of the boat, *Holy Family*, have found a new feeling of safety with the F-M OP because they can go further, stay longer, catch more fish and have plenty of fuel for the homeward trip. In short, the small OP insures greater profit and safety for the captain and crew—greater peace of mind for the families of the crew at home.

The *Holy Family*, 94-foot Gloucester fishing boat, is the first commercial vessel to be powered by the new Model 38F5¼ Fairbanks-Morse opposed-piston diesel engine.

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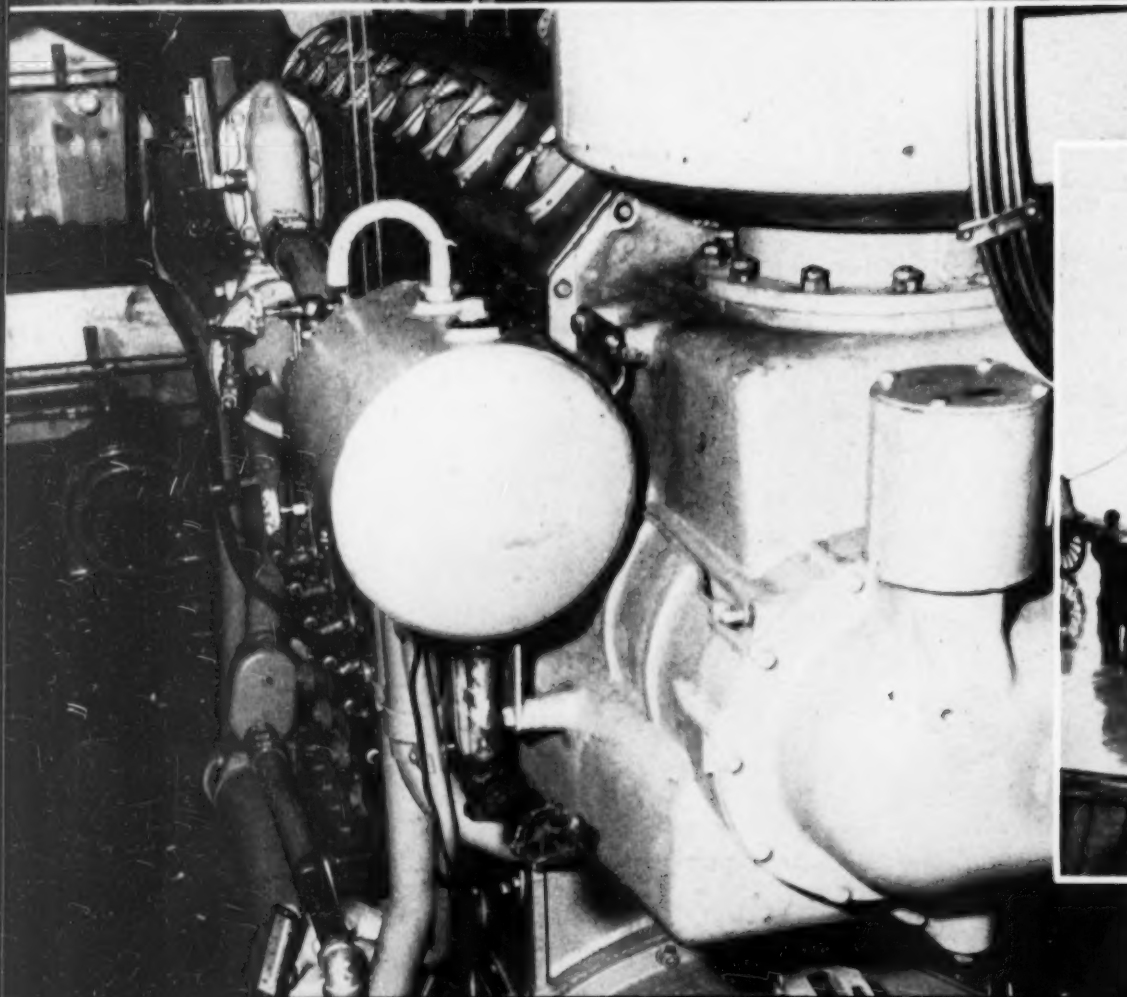




This 7-cylinder, $5\frac{1}{4} \times 7\frac{1}{4}$, Fairbanks-Morse opposed-piston diesel is the first of its kind to be put into service. The engine is rated at 525 hp. at 1200 rpm. and 455 hp. at 1100 rpm. for dragger service. Seen in the foreground are the Snow-Nabstedt reverse-reduction gears and Burgess-Manning air filter. Along the starboard side of the engine are the Air-Maze lube strainer, Purolator duplex fuel filter and the Commercial lube filter. On the Fairbanks-Morse gauge board at right are an Alnor exhaust pyrometer and Weston tachometer.

Nine years old, the fishing boat was built in 1944 at the Jonathan Story Yard, Essex, Mass. She is of all-wood construction, her hull lines being typical of most Gloucester fishing boats. She measures 94 feet long overall, $21\frac{1}{2}$ feet wide and 11 feet deep. Her net tonnage is 64 tons and her gross tonnage 124 tons. Like most draggers she was originally designed for maximum cargo carrying capacity, not for speed, the theory being that the more weight devoted to main propulsion equipment the less payload you can carry in the hold. In line with this reasoning a 320-hp. marine diesel engine was installed, giving her a speed of $7\frac{1}{2}$ knots, less than most of her competitors. The owners were understandably reluctant to trade cargo carrying capacity for additional speed but when the new small opposed-piston engine came along they were able to increase both at the same time. The new OP occupied less than half the space formerly occupied by the 320-hp. engine and part of the extra space was devoted to two additional fuel storage tanks, each of 1100 gallon capacity, increasing total fuel capacity from 5,000 to 7,200 gallons. An added dividend of the compact engine design was the elimination of a lot of expensive brass piping.

This port side view of the new Model 38F5 $\frac{1}{4}$ shows the Burgess-Manning air filter, Ross lube oil cooler, and Ross heat exchanger. At the extreme left rear is a 5-kw. engine-driven generator, which together with the other equipment mounted directly on the engine, makes this F-M diesel a complete packaged marine unit.



The new engine drives a four-bladed all-bronze propeller of 72-in. diameter and 48-in. pitch through a set of Snow-Nabstedt 3.79:1 reverse-reduction gears. Fuel oil is stored in six storage tanks, four located forward and two aft, passing through a full-flow filter before being picked up by the engine supply pump and sent to the individual injection pumps for each cylinder.

Jacket water is circulated in a closed system by a built-in centrifugal pump, being cooled in a heat exchanger mounted conveniently on the starboard side of the engine. The intake water is kept at an efficient temperature by a thermostatically-operated control valve which by-passed water around the heat exchanger as necessary. Lube oil temperature is regulated by a similar valve which by-passes lube around the oil cooler, also mounted on the starboard side of the engine. The amount of makeup water needed is negligible, averaging about two gallons every three or four months.

Lube oil is pumped under pressure to the cylinders and bearing surfaces by a positive gear-type pump built into the engine. Oil is cleaned continuously by a full-flow strainer and a portion is by-passed through a filter. This filtering system has been so effective that no oil change was found necessary for the first 2500 hours of engine operation. Samples are sent regularly to a laboratory at the end of every second trip for complete analysis and almost invariably are found in excellent condition. A hand-cranked pre-lubrication pump is provided for supplying oil to the cylinders and bearing surfaces before starting up the engine. Sea water is used for cooling purposes, being picked up from the boat's sea chest by an engine-driven pump and sent to the heat exchanger and lube oil cooler.

Instantaneous engine control from the pilot house is provided for both forward and reverse speeds by a set of air-actuated, finger-tip controls conveniently located on the bulkhead just behind the wheel. A duplicate set of controls, also of the push-button type, is mounted on the reverse-gear housing in the engine room. A two-stage air compressor, driven off the main engine, supplies 250-lb. compressed air. Electric power is provided by two generators, one of 5 kw., driven off the main engine, and the other of 6 kw., driven by a 10-hp. Fairbanks-Morse diesel engine. This is sufficient for both ship's service and auxiliary needs. The pilot house includes a hand steering gear for controlling the vessel's steel rudder, radar, radio-telephone, Loran, radio-direction-finder, two fathometers and a three-trumpet air horn. Located well aft, near the stern, it is high enough to provide a wide range of vision.

Driven through a front-end takeoff and a 100-hp. Air Flex clutch on the main engine, the winch is used to run one fishing net at a time over alternate sides while the boat is moving through the water at a speed of about three or four knots. The nets drag along the bottom, trapping such ground fish as cod, haddock and flounder. When the nets are full or snag on the ocean floor, they are hauled up and the catch dumped into the hold. Meanwhile the other net is dropped over the opposite side and the dragging operation continues.

Normally the *Holy Family* operates over an area from Cape Hatteras to Newfoundland and stays out for one or two weeks on each trip, coming back into market as soon as her hold is full. Four days are generally spent in port while the catch is unloaded, the vessel reprovisioned and refueled

and the crew given a chance to visit their families. The fish is sold at auction at the fish exchange and is often cooked and quick-frozen right at the pier. It is then packaged and shipped out all over the country.

The *Holy Family* is owned in partnership by Captain Matteo Mocerri and Girolamo Lovasco. Sebastian Mocerri, one of the captain's three sons, is chief engineer and Carlo Mocerri, another son, is chief mate. The crew is paid on a share basis, their salaries at the end of each trip depending upon the size of the catch. In this way they benefit as well as the owners from the increased profits made possible by the new OP engine.

List of Equipment

Main engine—One 7-cylinder, 2 cycle, Model 38F514 opposed-piston marine diesel with 5¼-in. bore and 7¼-in. stroke. Rated at 525 hp. at 1200 rpm., 455 hp. at 1100 rpm. Fairbanks, Morse & Co.

Generators—One 6 kw. auxiliary generator driven by 10-hp. diesel engine. Fairbanks, Morse & Co.

One 5 kw. generator off main engine, Imperial.

Remote engine controls—Fairbanks, Morse.

Heat exchanger—Ross.

Lube oil cooler—Ross.

Lube oil filter—Commercial Filter.

Duplex fuel oil filter—Purolator.

Lube oil strainer—Air-Maze.

Air horn—Kahlenberg.

Reverse-Reduction gears—Snow-Nabstedt.

Air filter—Burgess-Manning.

Exhaust pyrometer—Alnor.

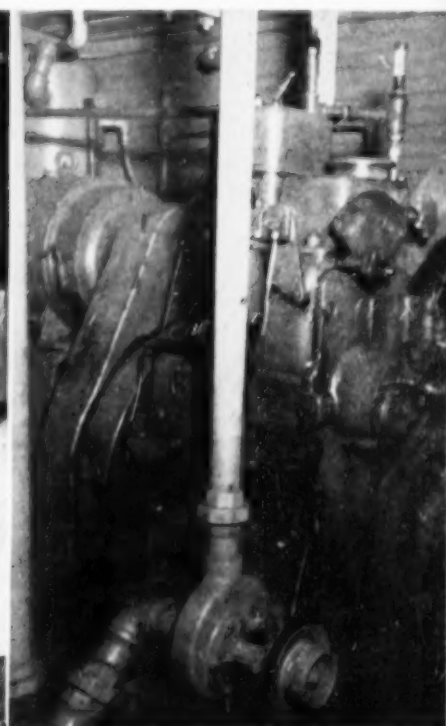
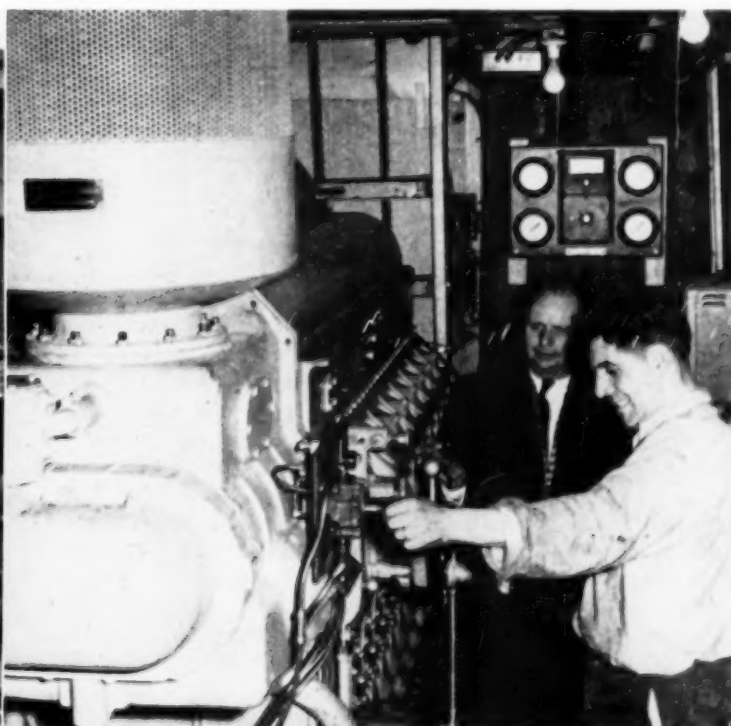
Tachometer—Weston.

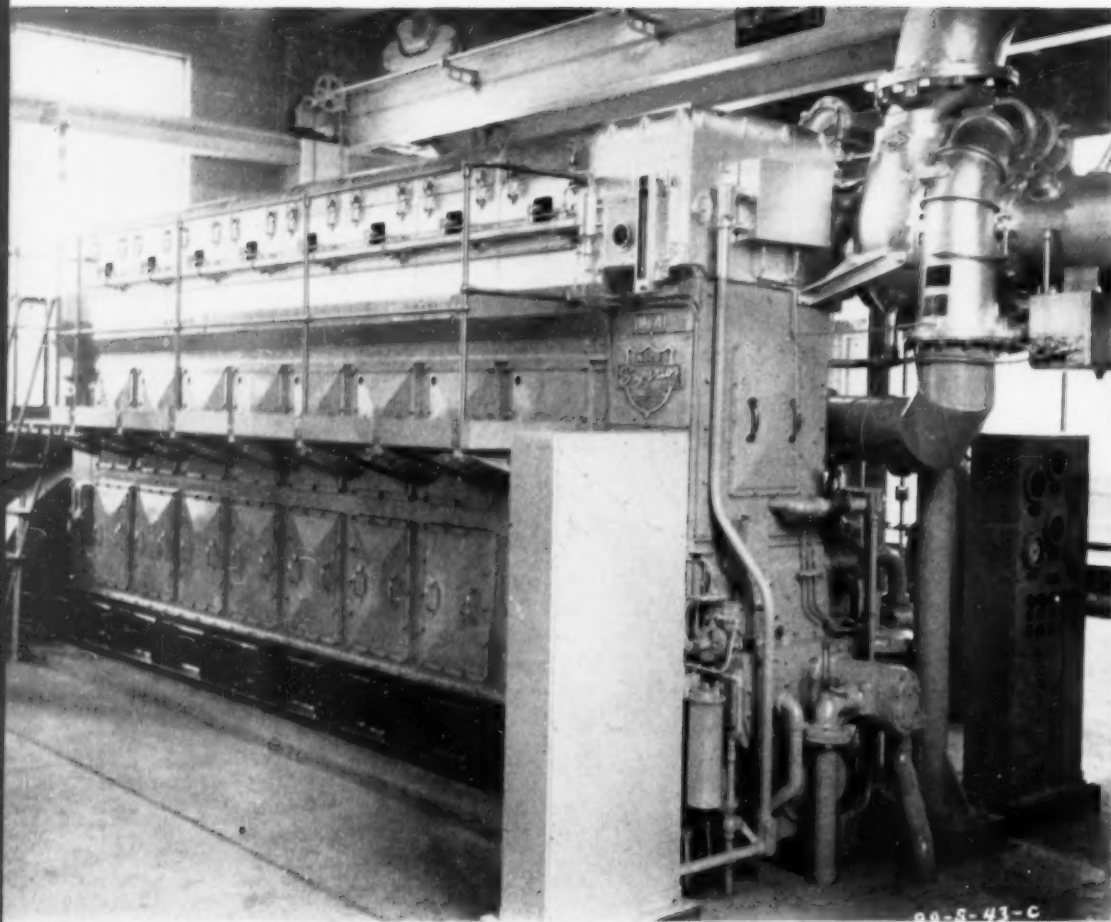
Builder—Jonathan Story Yard.

The *Holy Family* unloads 165,000 pounds of fish at the Boston Fish Pier. The compact size of the new O-P enables her to carry 40,000 more pounds of paying cargo than she could ever carry before.

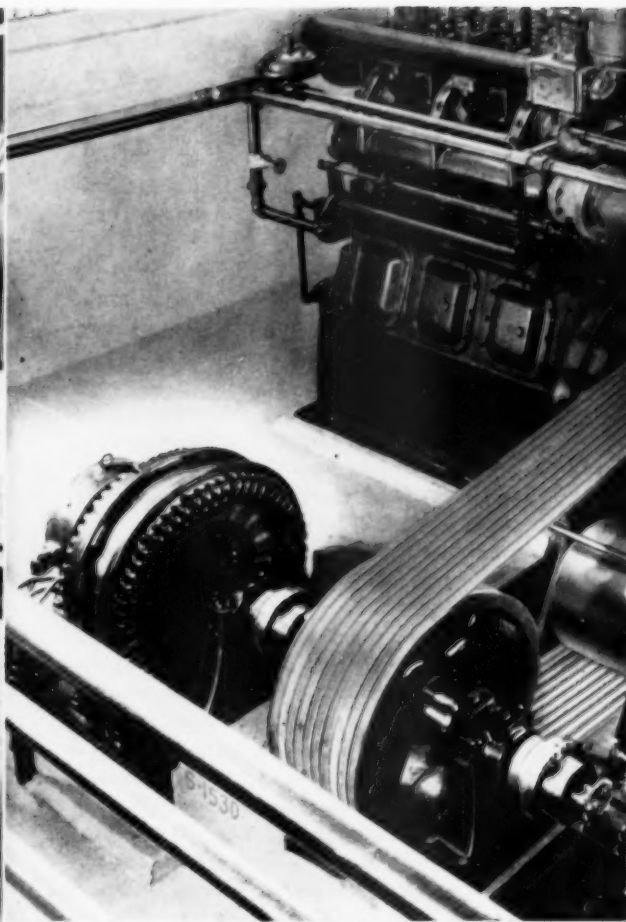
Captain Matteo Mocerri (rear) and Sebastian Mocerri, chief engineer, check the new small opposed-piston engine after a recent trip. Just a little more than head-high, the compactly designed O-P is only half as long as the 320-hp. diesel it replaced.

Part of the electric lighting and power needs of the *Holy Family* is met by this 6-kw. Fairbanks-Morse diesel-generator set, located in the engine room.





This 1440 hp. Superior supercharged dual-fuel diesel drives a generator in the Columbus, Ohio sewage treatment plant. The engine operates on sewage gas with a small quantity of pilot oil.



This Worthington sewage gas engine, rated at 157.5 hp., was put into service at Springfield, Illinois, in 1934 and

ENGINES operating wholly or in part on sewage gas are playing an ever-increasing role in solution of the nation's serious pollution problem. As reported in the first article of this series, the United States Public Health Service estimates that there are 22,000 sources of pollution in the United States and only 11,000 treatment plants, of which at least 2,500 are inadequate. It is calculated that municipalities must spend a minimum of \$400,000,000 to \$450,000,000 a year for the next 10 years to control pollution. If engine builders cooperate with the many forces working for adequate sewage treatment and educate all concerned in the operating economies of the sewage gas engine, they will be rendering a public service while expanding a potentially important market for power equipment. Two questions present themselves immediately: 1) How much power does a sewage plant use and how much savings is possible? 2) How big must a treatment plant be before it can profit by installation of a sewage gas engine?

Power can be a major element of operating expense in the modern sewage treatment plant. Commonly, the full volume of raw sewage is pumped to a sufficient elevation to permit gravity flow through the plant. Greatest power consumers are the blowers or compressors that provide from 4 to 1.0 cu. ft. of air per gallon of sewage for aeration. Then there are many miscellaneous pumps for recirculation, sludge handling and the like, and many other pieces of essential power-consuming equipment. One authority estimates power requirements

URGENT NEED FOR MORE

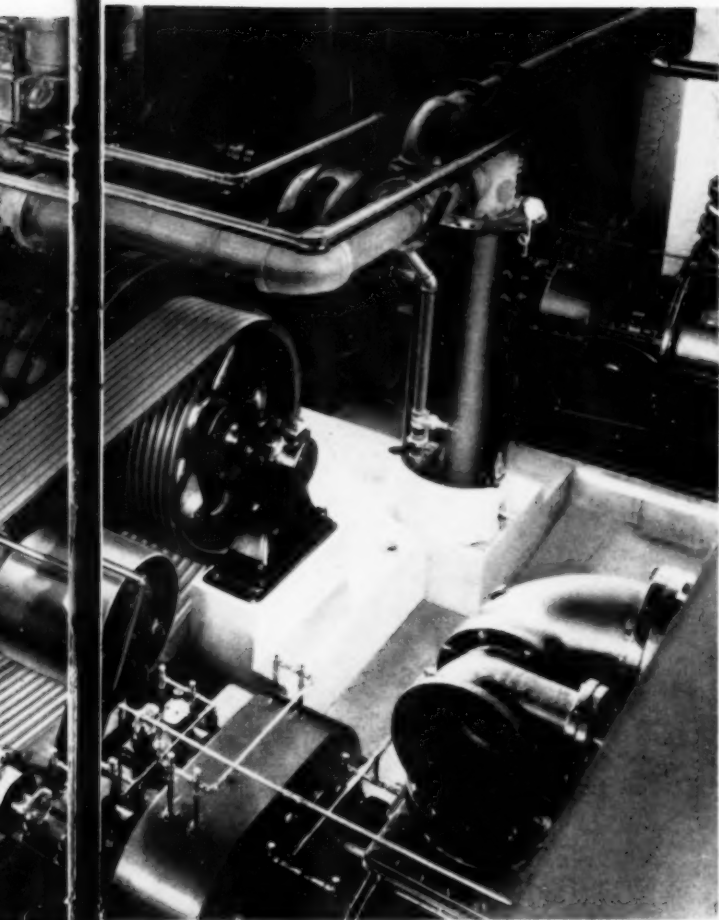
By WILLIAM H. GOTTLIEB

at a minimum of 200 kilowatt-hours per million gallons for pumping, from 300 to 750 kwh. for aeration (depending on the volume of air used in the system) and 50 kwh. for plant auxiliaries and lighting, a total of 550 to 1,000 kwh. per million gallons. Obviously, the figures vary from plant to plant to accommodate differences in location, operating conditions and methods of treatment.

The sewage gas engine, utilizing a waste product of sludge digestion, is an extraordinarily efficient and economical power producer and savings as compared with purchased power rates are considerable. Here are a few examples of the actual savings achieved by treatment plants through the use of sewage gas engines: The City of Colton, California, uses a 50-hp. Buda engine to drive a 2800 cfm. Sutorbilt blower for aeration of sewage. Capable of operating on either natural gas or sewage gas, the unit runs all the time on the latter and saves approximately \$360.00 a month compared with the cost of natural gas. Aurora, Illinois, replaced electric motors with two 75 hp. Climax spark-ignition sewage gas engines to drive a pair of American Well Works pumps. In 30 months, after deduction

of all engine operating expenses, the city calculated a net saving of more than \$11,000.00 compared with the cost of purchased power. Fort Wayne, Indiana, has long used a 465 hp. Worthington spark-ignition sludge gas engine to drive a blower. In six years of service, this one unit achieved new savings of \$199,000.00 compared with the cost of electric power. Savings in a single year were as high as \$38,000.00, actually \$6,000.00 more than the cost of the engine. Columbus, Ohio, has been using three 750 hp. Superior sewage gas engines to drive generators supplying electric power for treatment plant operation. In six years, these engines produced 32,000,000 kwh, which, at a price of 1 cent a kwh., would have cost \$320,000.00. This is about \$100,000.00 more than the cost of the entire power plant.

Basic reason for the savings achieved by all such engines, of course, is their use of gas developed in the digestion of sewage sludge. This gas has a lower heating value of 500 to 600 btu. per cu. ft., compared with 900 btu. for natural gas. A typical analysis shows the following percentages by volume: CH₄ (methane) 62.4 percent, CO₂ 34.8 percent, and



is believed to be the first modern four-cycle sewage gas engine to be installed in a treatment plant.



Live steam generated by the Enterprise engines in the San Diego, California, sewage treatment plant activates the sludge in the covered cookers shown above. The gas thus generated is used by the engines as fuel.

SEWAGE DISPOSAL PLANTS

Part II

N_2 2.8 percent. Not only is the fuel a free waste product but an unusually high percentage of its heating value can be put to useful work. Sludge digestion tanks must be heated to speed the process and waste engine heat can be utilized for this purpose. Adding the heating value of the power produced to the heat recovered from jacket water, lube oil and exhaust gases, it is possible to utilize more than 83 percent of the total heat input. There are, of course, variables based on type of engine, load factor, and plant design, but in any well-designed plant, over-all efficiency is at a high level.

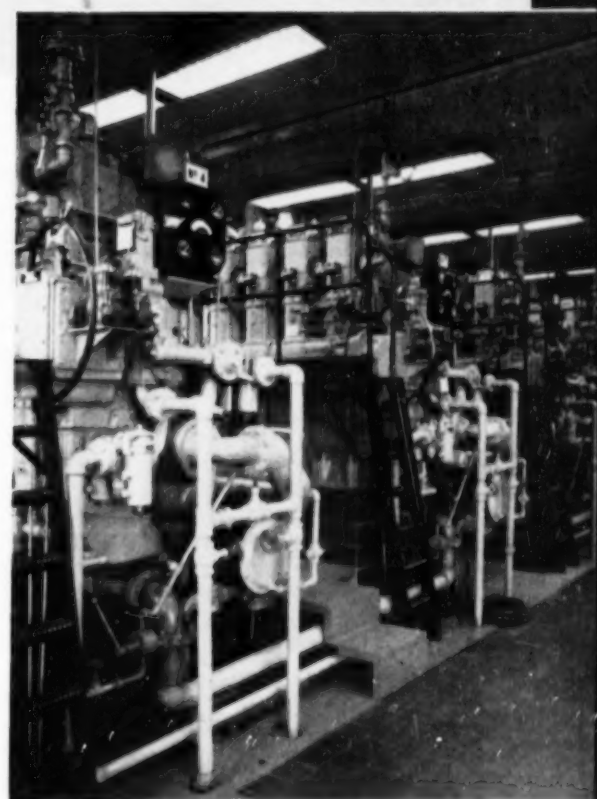
What factors must be considered in determining whether sewage gas engines can be used profitably in any given city, any existing or projected treatment plant? Obviously, the availability of sewage gas is the first consideration. With an adequate gas supply, no other fuel-burning prime mover can match its economy. The character of the sewage and the method of treatment influence the quantity of gas developed in the digesters, but a fairly dependable rule of thumb is that there will be 1 cu. ft. of gas each day for each person in the population served. Addition of ground garbage to the

sewage can triple the gas yield although there is some rise in carbon dioxide at the expense of combustible methane.

Given 1 cu. ft. of gas per day per capita, we can calculate the size engine which can be run on a 24-hour basis for a city of any size. Using 1 cu. ft. per person and a conservative 500 btu. per cu. ft. (LHV), we get the simple formula:

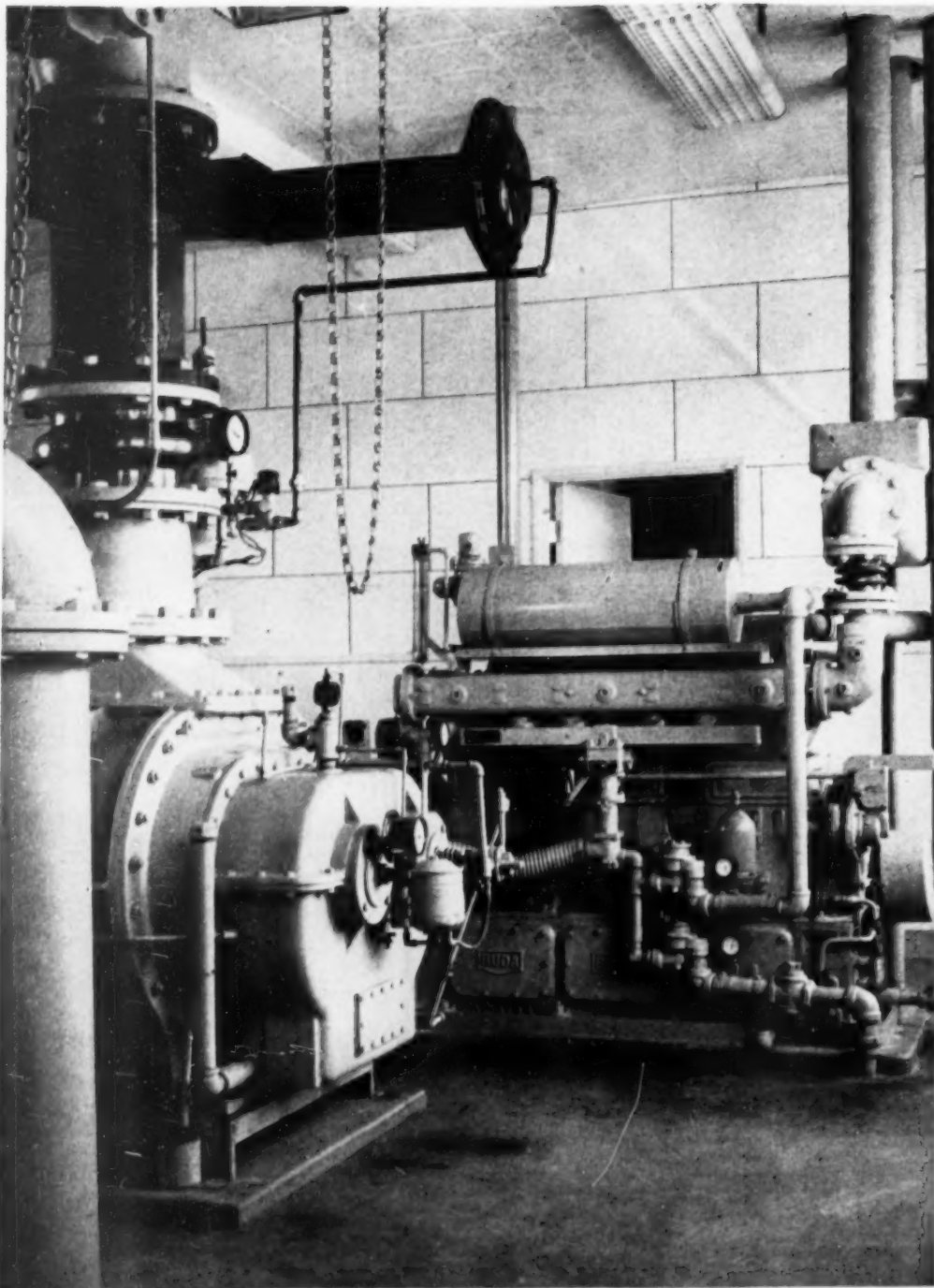
$$\frac{\text{Population served} \times 1 \times 500}{24} = \text{Average Btu./Hr.}$$

Divide btu. per hour by the full load guarantee of the engine, roughly 7,000 btu. per brake horsepower-hour, to get the horsepower size for 24-hour operation. On this basis, a plant serving 100,000 people would have gas to run a 300 hp. engine. Again there are variables in each local situation: the heating value of the gas, the yield per capita, the availability and capacity of gas holder, load conditions, type of engine, and the like. But the formula provides a good rough calculation. On this basis, a plant must serve a population of about 17,000 to operate a 50 hp. engine which is about the smallest being built for this type of service. But a



A view of the four Enterprise sewage gas engines at the modern San Diego plant that drive Weston right angle gears through which they drive F-M pumps.

gas supply for 24-hour service is not the sole determinant in choosing a sewage gas engine. It may be profitable to use sewage gas to supplement other sources of power or other fuels. Thus, a plant handling sewage for a population of 10,000 to 20,000 may well be able to justify an engine-driven generator to be operated in parallel with purchased power. The greater the size of the plant, the more



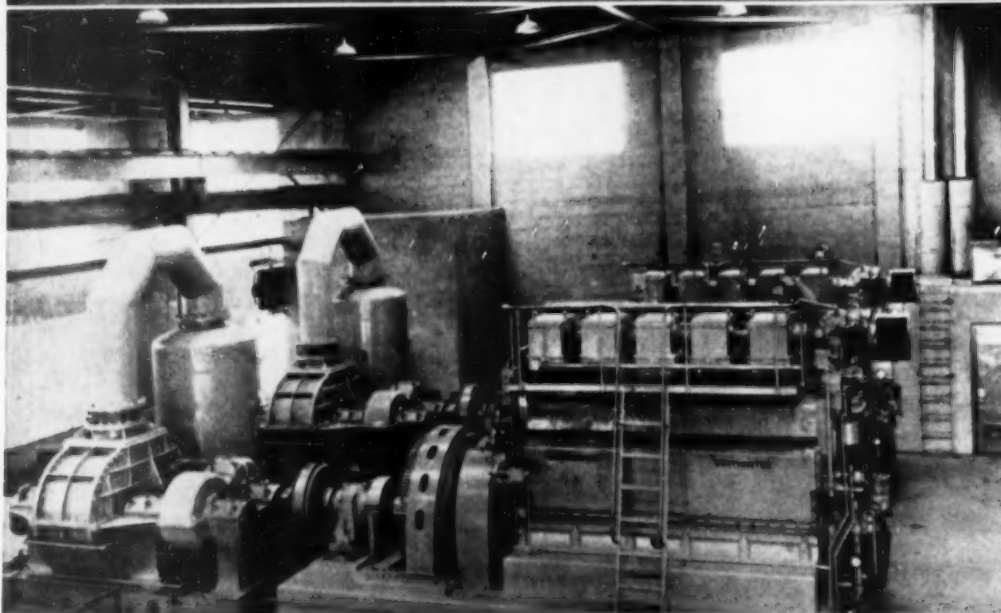
A 50 hp. Buda engine, operating on sewage gas, drives a blower in the Colton, California, treatment plant.

certain it is that sewage gas engines can be used with profit.

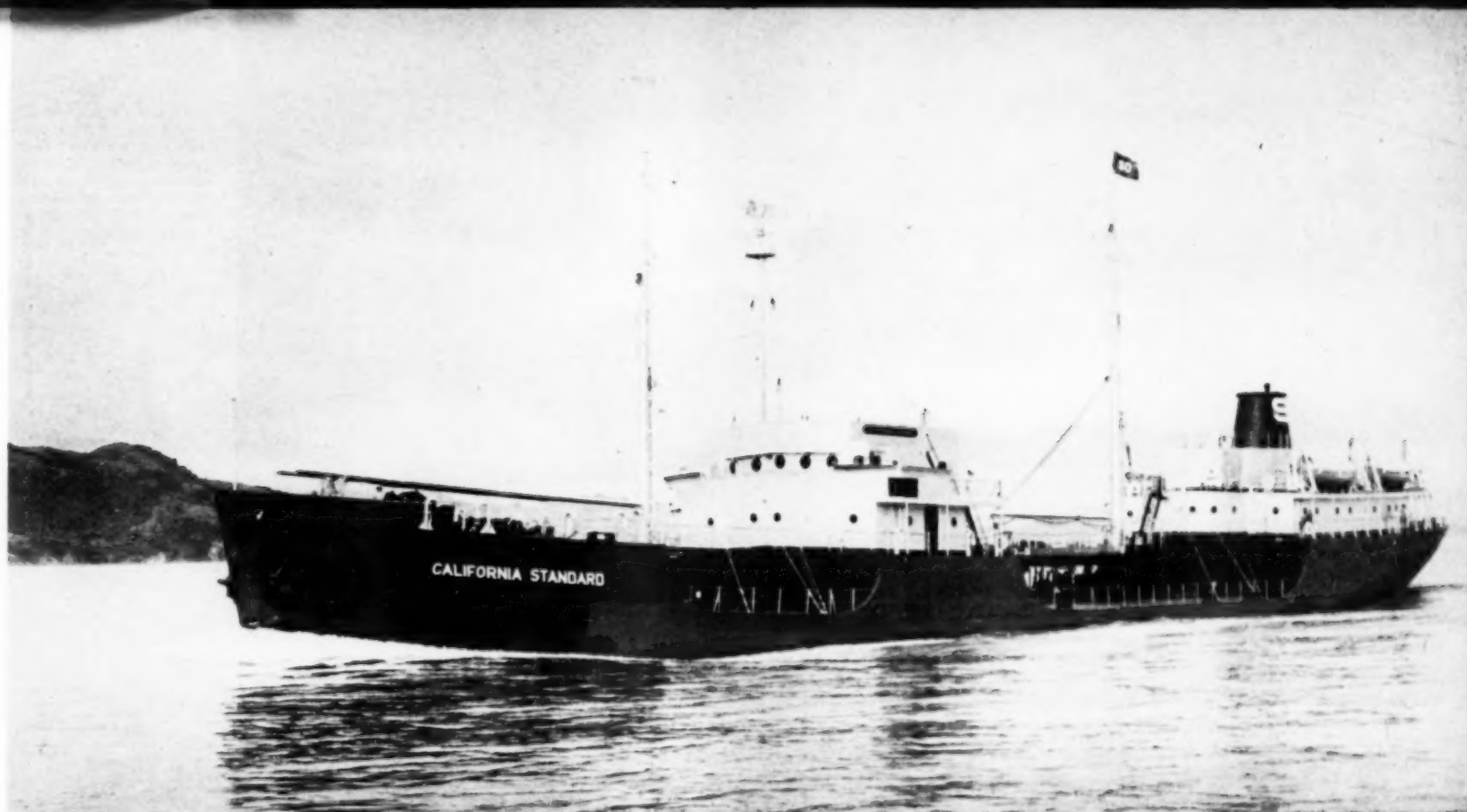
The possibility of using other fuels to supplement sewage gas has greatly extended the use and the flexibility of sewage gas engines. The original engines in the field were spark-ignition units and these make up the largest number now in service. Many such engines are equipped with dual mixing valves and fuel control valves so that natural or manufactured gas can be used when the supply of sewage gas is exhausted. Some units can operate on gasoline or liquefied petroleum gases. The greatest impetus has come, however, from the dual-fuel diesel which operates on the efficient diesel cycle and utilizes fuel oil as a pilot charge to initiate combustion in the cylinder. This type of engine automatically increases the quantity of oil injected to compensate for any diminution of sewage gas and switches to full oil operation if the gas supply fails. It is thus possible for a plant to use whatever gas is available and supplement this with oil as necessary.

The advantages of the dual-fuel engine are many. It is possible to install power units large enough to handle the full design capacity of a treatment plant, although currently there is not sufficient gas for full-time operation of a gas engine. In the case of a new plant, the engines are able to supply power as soon as the plant is put into service without waiting for production of gas in the digesters. A treatment plant can install dual-fuel engines large enough to meet all power requirements and make itself completely independent of outside power sources. Dual-fuel engines provide protection against failure of the gas supply by increasing the quantity of fuel oil as needed. The amount of pilot oil required for ignition is small and in some plants nearly equals the amount by which available gas must be supplemented to supply all power requirements.

We now have introduced another factor which must be considered in deciding whether a sewage gas engine is practicable for a plant or in determining the size of engines which can be utilized with profit. Potential savings can be figured only by balancing the quantity of sewage gas available plus the cost of supplementary fuel against the cost of purchased power. Here are some of the questions that should be answered before an appraisal is made: 1. What is the population to be served to determine capacity of the treatment plant? 2. What volume of sewage gas is available? (Actual or estimated) 3. What is the heating value of the gas? (Actual or estimated) 4. What are the horsepower requirements of the total plant and of the major pieces of equipment? 5. What engine fuels are available and at what price? What type of engine? 6. What are the rates for purchased power?



Two 660 hp. Worthington dual-fuel engines drive both generators and blowers in the Bergen County sewage plant at Little Ferry, New Jersey.



An 8-cylinder Enterprise diesel drives the *California Standard*. The vessel has a 31,880 barrel bulk capacity. It serves the northwest coast with cargoes of oil to Eureka, Crescent City and Coos Bay.

OIL OVER THE BAR

Dale Holden, Dean of Coos Bay Pilots, Brings Sea Borne Diesel and Gasoline Shipments into Harbor for Storage and Distribution by Big-7 in Southwest Oregon

By F. HAL HIGGINS

GO see Dale Holden, dean of the Coos Bay harbor pilots, if you want the facts on bulk oil shipments that are unloaded for the oil companies' distribution to Southwest Oregon diesel engines. Pilot Holden is rolling into his 70's, but he is still so dependable that Standard of California will hold their boat out off the bar for a half day till he can get out to bring their shipments over the bar and into the harbor." Thus did the diesel engine dealers and distributors direct the writer when he got up to Coos Bay recently to have a look at and check on the big dieselized development around fishing, logging, mining and lumber exporting. Coos Bay, he knew, rated top in lumber exports for the whole world, and at the two towns on Coos Bay, one named for the bay itself and the other called North Bend, lumber exports had an important place in the industry.

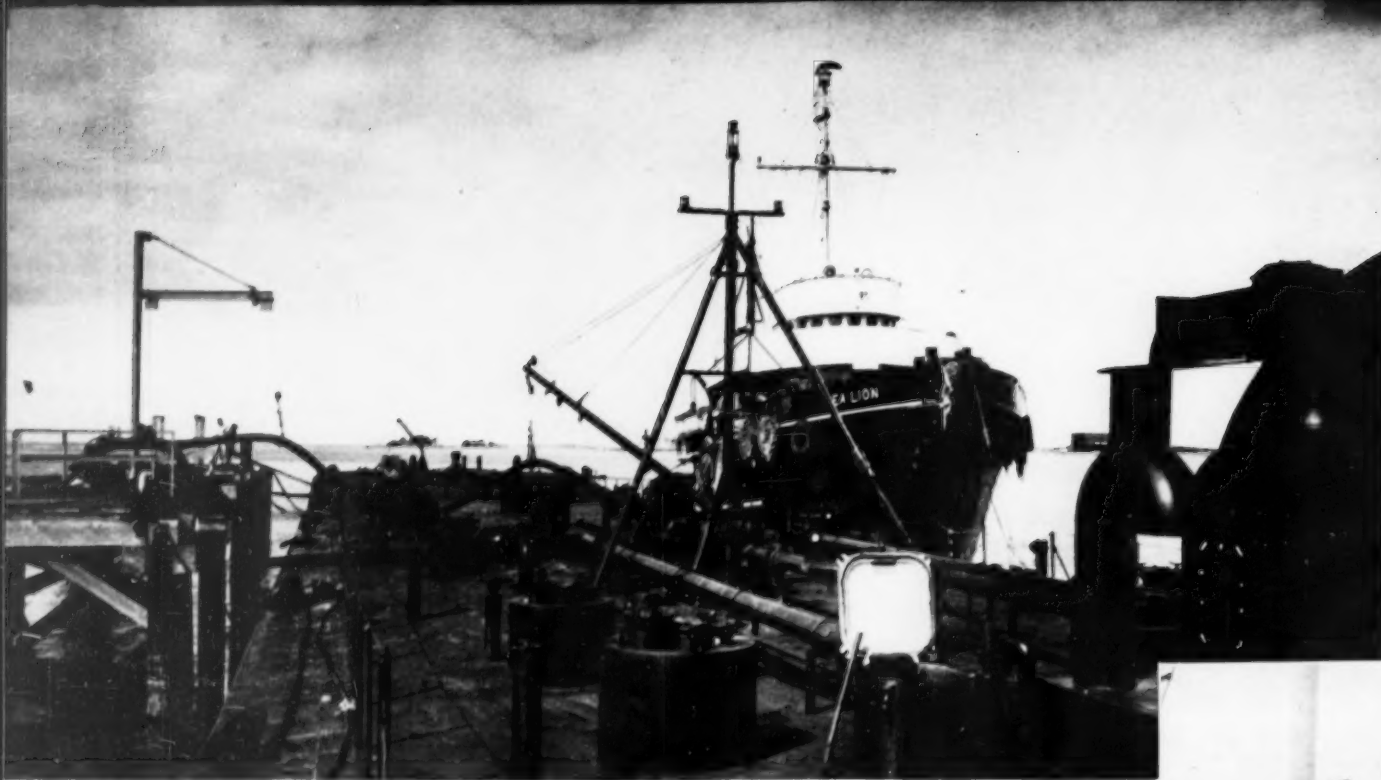
So, the visitor went over to the Texaco gas station on Broadway to meet Pilot Holden, who drove in from home to help get the facts on the marine side of diesel distribution and operation from the time he goes out in the *Cygnets* to pick up the Standard Oil of Cal. oil cargo to bring it safely over the bar.

"This *Cygnets* boat takes me out," explained Holden. "It is powered with twin GMC diesels with 5 to 1 reduction. Let me drive you over to my friends in the diesel sales and service business. They can check my recollections to make sure we don't overlook any. We'll stop in at Elfving's. They handle marine and builders' supplies and represent the Cummins Engine Co. here. But let's have a look at the *Karen* out behind here getting a Cummins change-over after 14 years with an early model Cummins. They are putting in the same size engine but with double the horsepower as they change from the old 150 hp. Cummins to the new 300 hp. The *Karen* has done a lot of fishing in those 14 years of diesel as it dragged the nets for the *Karen's* crew. Naturally, the bigger horsepower it is getting enlarges the hauling capacity for fish.

"Now, let's look into the office and get their help on these diesel marine installations that work in and out of Coos Bay. Knutson Tugboat Co. has four boats powered by NHR 5300 engines. Then the same firm has *Koos 2, 3 and 4* powered by Cummins in their 2 and 4, and by Gray GMs in 3. They also own the *William Bonn* that is powered by a

Cummins of 160 hp. That's eight boats all diesel for that firm.

"The Coos Bay Tug and Barge Co. has the *Umpqua Chief* powered by a Cat of 135 hp. engine, the *Pacific Skipper* with a 160 hp. Gray GM, and two others with western Enterprise diesels of 150 and 160 hp. These are the *Hercules* and the *Sons*. The Al Pierce Lumber Co. owns three dieselized boats: the *Logger* with a 100 hp. Cummins, and the *Blanco* with a 160 hp. of the same make. Their *Florence D* has an Atlas Imperial of 120 hp. The Cape Arago Lumber Co. with headquarters, mill and retail yard at Empire and a loading spur here at North Bend own two Gray GM-powered boats, the *Atomic* and the *Stevie*. Engines are 160 hp. Harbor Towing Co. has three Cat-powered boats: *Ranger* and *Rustle*, each with a 200 hp. engine, and *Myrtle* with a 90 hp. motor. Coos Bay Lumber Co. owns and operates the *Coos King* powered by a Cummins 250 I. with MG Twin-Disc gear, and the *Sun* powered by a 3-cylinder Atlas. Evans Products Co. has a boat powered by a 6-cylinder 80 hp. Buda. Russell Tow Boat Co. has a Cat D13000 engine in their boat."



One of the Red Stack dieselized tugs of the United Towing Co., the *Sea Lion*, powered by twin GM diesels (900 hp.). The tug has just delivered a barge-load of 1,270,000 gallons of oil.

Pilot Dale Holden poses next to the *Cygnat* which takes him out over Coos Bay bar. The craft has two GM diesels.



Elfvings, the Cummins Engine representative in the Coos Bay area.

From Elfvings, Holden piloted the visitor over to the North Bend side of the harbor. A stop at the GM dealer's place along the water front brought the writer into the Woodbury & Lillebo, Inc., store that has repair dock in rear while facing on the highway as do all the sales-service places of business in the key harbor areas that depend on marine business. The marine Gray war surplus gave the GM dealers on the West Coast a big advantage in getting a lot of diesel engines that could be sold and installed cheaply and easily while the competitive engines had to wait for postwar stocking up at top prices. Also, it gave the GM dealers an abundance of parts for service, according to Loren Schrantz, office manager. One complaint voiced by this GM dealer is that the electric power lines are beginning to take over the mill power to cut down both future diesel business in that field and also to eliminate those already installed. That's an old story with the power line vs. stationary diesels for irrigation pump work, of course, so it is one of

those "Diesel Good Deeds" to the consumer who gets the electric power at a lower price than he would have without the competition. But there is also tendency toward electric motors for the small mills, this observer noted. The small diesel engine in a power unit off to one side at the small mill is a real market. In other words, the diesel-electric unit has a field that is sound and growing as long as the present building boom keeps up.

The GM dealers here on Coos Bay harbor have Coos and Curry counties to give them the coast right down to the California line. Logging trucks with diesel engines are coming in stronger and stronger. Most of these are coming up from California via highway 99 to operate on a custom basis.

They come in for the summer and fall and go back to California for the winter. Down at Brookings, on the coast, there are a fleet of ten 6-cylinder GM powered trucks now logging. They are still com-

The *John Bakke* at Coos Bay taking on a load of lumber for export to the Orient. Her propulsion unit is a Burmeister & Wain diesel.



Allis-Chalmers HD-19 with GM diesel hauling logs out of a west Oregon forest. Supplying the great lumber industry of the Northwest with oil has made possible its tremendous expansion.

A Standard Oil of California marine service station on Coos Bay as a diesel engined fishing boat ties up for diesel fuel.



ing up to haul logs for the big outfits' logging operations for the big mills. Out of Brookings a lot of lumber is being trucked to California as well as record water shipments from the Coos Bay harbor. The GMC speaker reported that the water borne lumber goes mostly to the east coast, but a lot also goes to Japan and as far down the California coast as San Diego.

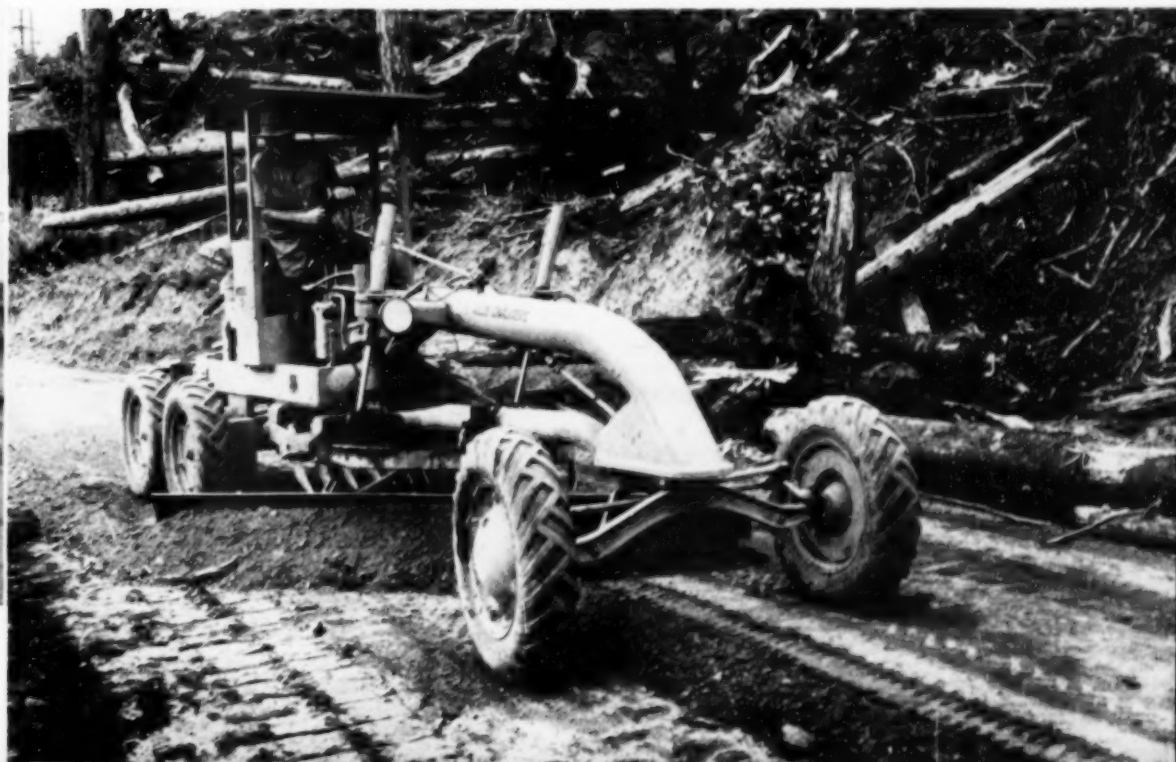
Shovels, loaders, dredges and other construction equipment also take the GM diesels from this harbor dealership. Two Tournapulls with GM engines are building roads up the coast north of Coos Bay near Brandon. Then the Allis-Chalmers tractors and blade graders also are equipped with GM diesels and they call for engines and parts.

"Let's drive over and see the big freighters loading lumber and I'll show you the pilot boat that takes me out over the bar to bring in the Standard loads of bulk fuels. This is the *Cygnat* powered with

twin Gray GMs of 160 hp. each, driving one screw from a bull wheel 5 to 1 reduction. I feel at home with the *Cygnat*, of course. There's a big Japanese freighter there, but they don't have diesel engines, you will note by the smoke. That Norwegian *John Rakke*, however, is a diesel job; probably a Bolander-Munktel. (It proved to be a Burmeister & Wain.) Here come a couple of boats towing rafts of logs. One is powered by a Cummins and the other by a Gray GM. Note how smoothly and powerfully they move past. Over there is the tanker *Axtell J. Byles*."

There is no question about where the diesel engine stands today in this area. Diesels are old marine hands in the bigger sizes, of course, and the foreigners have had them for a long time. But it is something new to see them hauling diesel fuel up the Pacific Coast and over the bar to power the tremendous logging and lumbering industry that has grown so fast and big in the past decade.

A GM dieseled Model D motor grader maintaining 14 miles of mountain logging road along the Oregon coast. The grader is owned by Harrington-Ray Lumber Co., Brandon.





TWIN DIESEL TUG "MILKA. M. PELLEGRIN"

THE *Milka. M. Pellegrin*, a new 59-ft. steel tug, went into service recently in the shallow waters of the Louisiana oil fields and in off-shore coastal operations towing and spotting drilling rigs. A draft of only 5½ ft. fully loaded (4½ ft. light) enables easy operation. The new tug is powered by two new Model 35 supercharged Atlas Imperial diesel engines of 300 hp. at 1200 rpm., equipped with Brown Boveri superchargers.

Designer and builder were Friede and Goldman,

Shallow Draft Twin Diesel Engined Tug Goes Into Service in Shallow Waters Off Louisiana Coast, Towing and Spotting Drilling Rigs

By W. L. BODE

LKA.M.PELLEGRIN

LEGRIN"

New Orleans, La., and Alexander Shipyards, New Orleans, respectively. Arthur Duvic's Sons, The National Supply Company's Gulf Coast representatives, equipped it and supervised installation of equipment. Copper tubing and fittings are used throughout, and modern cooking and washing facilities are provided for the crew.

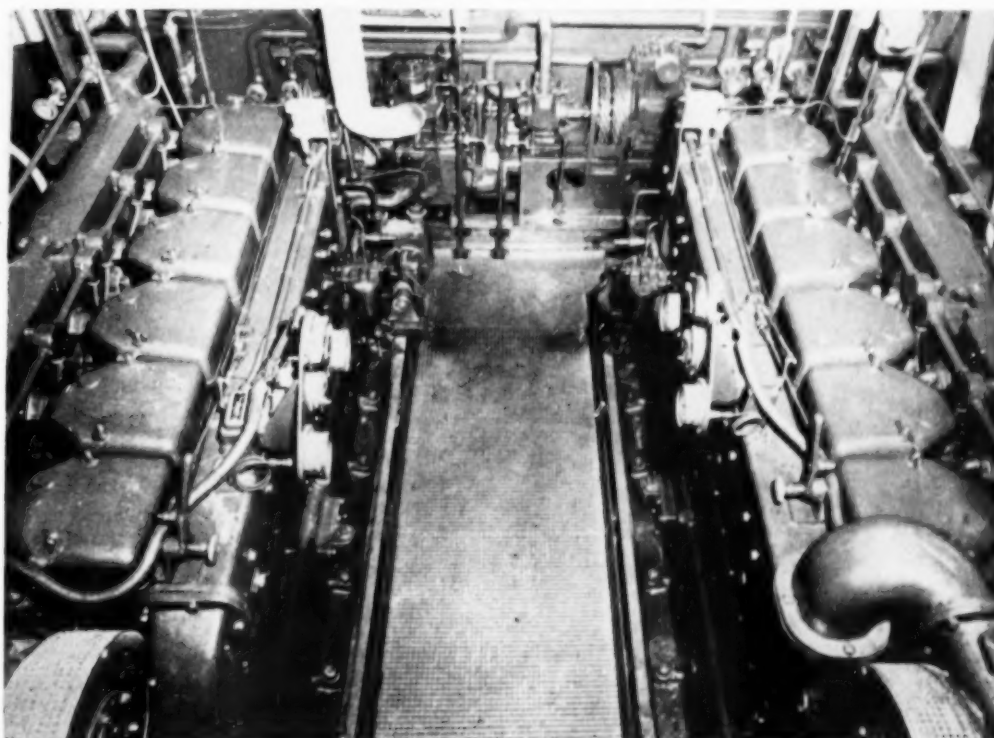
Mr. Easton Pellegrin, manager of the towing company, named the boat for his father, now deceased, who founded the firm in 1936 in Chauvin, La.

FEBRUARY 1954



The first of the two Atlas diesels, reverse and reduction gear equipped being lowered into the double chine all steel hull of the *Milka M. Pellegrin*. Note the Brown Boveri supercharger.

The two Atlas Imperial diesel engines of 300 hp. at 1200 rpm., equipped with Brown Boveri superchargers powering the *Milka M. Pellegrin*.



EXTENDING THE RANGE OF EFFECTIVE TORQUE CONVERSION

By R. H. MILLER*

WESTERN Gear Works transmissions are designed for application with torque converters to extend the range of efficient torque multiplication of a diesel engine-torque converter power unit. The transmissions for industrial use have two speeds and are easily shifted to the desired ratio under full load by simply throwing an air valve. Shifting under full power is quick without decelerating the engine, without loss of load and without shock. These transmissions add greater flexibility and a wider operating range to torque converter applications where loads vary from light to heavy.

By offering two ratios that can be shifted under full power without loss of load, a practical solution to the problem of applying torque converters to all

*Application Engineer, Western Gear Works.

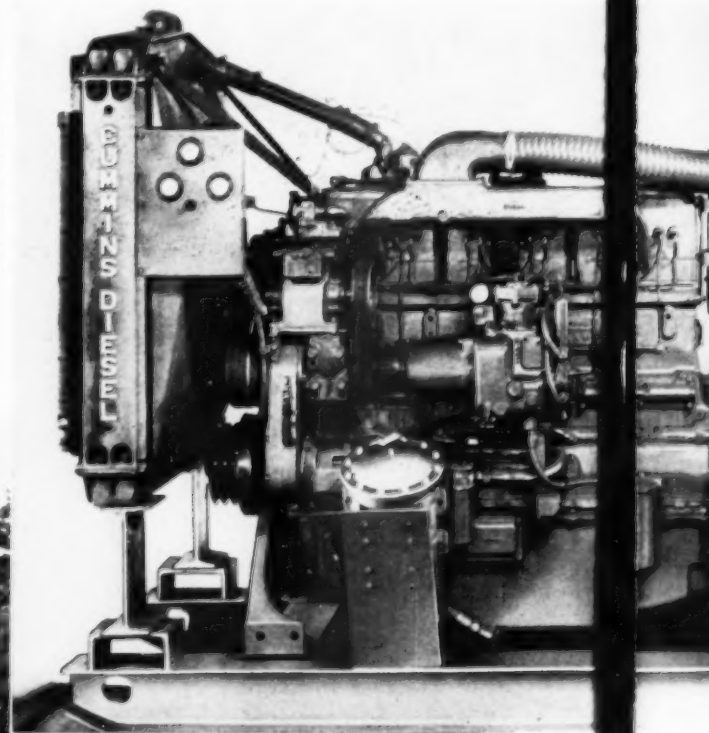
types of machines that are required to handle both light and heavy loads is available. It also permits utilization of the horsepower available in the diesel engine by keeping the torque converter operating in its efficient speed range, thereby permitting more horsepower to be transmitted to the machine which in turn increases production through more horsepower hours of work being performed. In order to obtain the desired speed range it is necessary to add one of several types of transmissions which can transmit engine power to the driven unit, giving either low torque with high speed or high torque with low speed, depending upon the requirements of the load. For convenience these transmissions can be divided into three main classes: the hand-operated gear shift type, air or hand-operated friction clutch type and the hydraulic-mechanical type. The transmission unit and

torque converter combination discussed here is of the hydraulic-mechanical type.

There are two inherent advantages to be gained from a hydraulic torque-converter. The first advantage is its ability to absorb shock. It is a cushion for all the gears, shafting and cable in the machine,

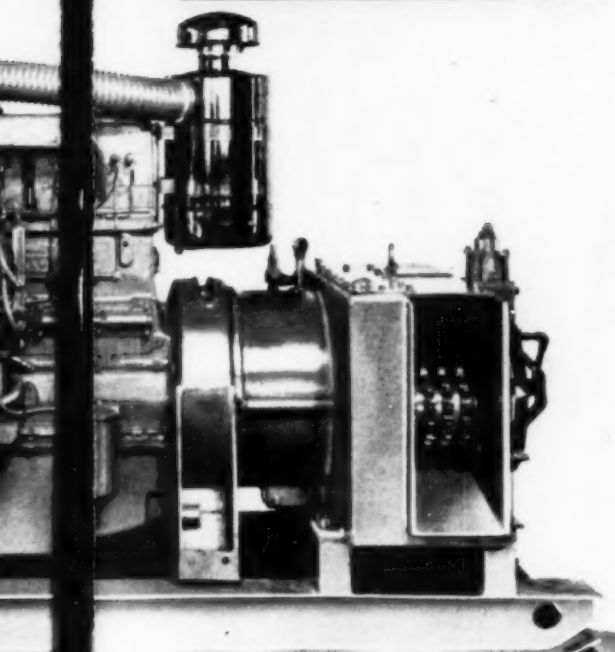
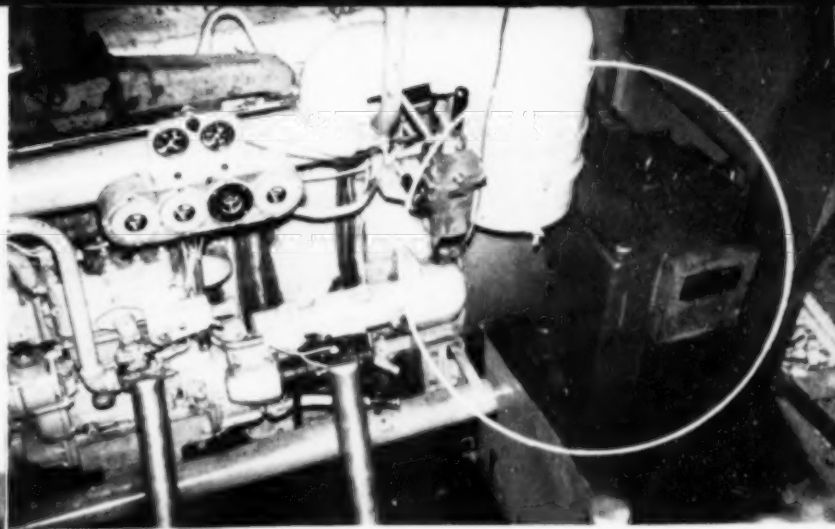
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Twin Torq-Masters are installed on this yarder using two Cummins diesel engines, rated at 300 hp. at 2100 rpm.



Pacific-Western Torq-Master assembly is mounted in this Industrial Brown Hoist crane. This type is a reversing transmission for use on locomotives and cranes.

Close-up of the Torq-Master Series 200 reversing box on the Cat diesel in the Industrial Brown Hoist crane. →



Cummins diesel with Western Gear Works Torq-Master 200 Series transmission.

greatly increasing their life and minimizing repairs. Second, is its ability to automatically increase torque similar to the steam engine as the torque converter is stalled. This multiplication of torque is three times the motor torque when the converter is stalled, providing the necessary torque to start and accelerate the load. Of course, for maximum overall efficiency, we must apply the torque converter, with proper ratios, so that it will operate within its most efficient speed range. In logging, for example, a turn of logs consisting of from one to six thousand log feet, may have to be pulled in on grades that range from steep uphill to steep downhill, to say nothing of the obstructions it may encounter in its path from the stump to the spar tree. For this purpose, a torque multiplication

ratio of approximately 4.5:1 has been found to be desirable, and we know that for best operation the unit must perform at peak efficiency throughout all of that 4.5:1 torque multiplication range. To obtain this range, Western Gear has added a special mechanical transmission unit (2.33:1 low gear ratio) to the torque converter (2:1 torque ratio in efficient range).

This transmission unit can be described as a spur gear planetary in which there is no annular gear; the output shaft of the torque converter being geared to a set of two step gears housed in a rotating cylinder which can be locked from rotation by a brake. With the gear cylinder locked from rotation, the step gears drive the output shaft at a reduced speed of 2.33:1. When the brake is released and the cylinder clutched to the converter output shaft, the drive is direct, or high. Thus, we have two speeds available; a low gear by applying an air-operated brake, and a high gear by applying an air-operated clutch.

A very important factor in obtaining satisfactory results has been the stored energy, due to the mass of the rotating parts, of this transmission while in direct drive (high ratio). If operating conditions occur where loads fluctuate rapidly and to severe extremes, and if these momentary heavy loads are allowed to pull the torque converter down into the inefficient range, it has equally diminished power to accelerate the load. This results in lost time and stalling. The stored energy in the revolving parts of the transmission maintains the speed of the converter in the efficient range in a great majority of such instances, thus providing the additional torque to prevent stalling. If greater torque is required than can be provided in direct drive, the air-operated shift of the transmission (under full power) makes a lower gear ratio instantly available, permitting the engine and torque con-

verter to continue to operate within their efficient speed range. Inasmuch as torque converter speeds are maintained in the efficient range, there is always ample energy available to accelerate rotating parts of the transmission when shifting from low to high without an undesirable reduction in speed. This arrangement is particularly effective because of the smooth application of power and the automatic adjustment of speed and torque by the torque converter.

A typical application of log loading equipment has been made by the Washington Iron Works in its new mobile Trakloader. This is a specially designed machine of great size, weighing approximately 120,000 lbs., with the utmost flexibility in both the propelling and hoist drives. An unusual installation of this transmission unit and torque converter drive has been made on a diesel driven veneer lathe with very satisfactory results.

About 500 of these transmission units have been in operation in the Northwest for several years on yarders, loaders, hoists, cranes and special applications. Standard units are in use with diesels rated up to 300 hp. at 2100 rpm, using a 3:1 torque multiplying converter. Other units are in operation with Cummins diesels rated at 550 hp. at 2100 rpm, with Western Gear's 19 in. converter and also Cummins diesels rated at 400 hp. at 2100 rpm, with Western Gear's 18 in. converter.

Certain models of the transmission units have been adapted to obtain a reversing box for use on locomotives by changing the gearing arrangements. Splining the bevel planetary gear cage to the brake and then splining the bevel gear from the brake onto the drive shaft plus building the original bevel gear splined to the drive shaft integral with the pinion completes the arrangement of gearing for this unit. The clutch is set for forward direction of rotation and moves the bevel drive gear that is splined to the shaft and the planetary cage in the same direction. Releasing the clutch and setting the brake holds the cage and the planetary gears become idler gears and rotation is reversed.

Of course, the greatest efficiency is obtained with proper selection and matching of engine, converter and transmission unit and, essentially, before any application is made the converter must be matched to the engine. Standard torque converters are available in 16 in., 17 in., 18 in. and 19 in. sizes for use with diesels rated up to 550 hp. at 2100 rpm.

DIESELIZED PILOT BOAT "VIRGINIA"

**Former Luxury Yacht Shows Greater Speed
And Maneuverability in Heavy Service for
Virginia Pilots Association**

By ROY JOHNSON

AMPLE power, easy handling, quick maneuverability and dependability are basic operating requirements of a pilot boat which must get pilots on and off incoming and outgoing vessels in all kinds of weather on a round-the-clock schedule. To assure such operation, the Virginia Pilot Association recently repowered the Pilot Boat *Virginia* which, except for the standby boat *Relief*, handles all 43 pilots in the Hampton Roads area. The two heavy-duty Fairbanks-Morse diesels selected for the job are 500-hp., 8-cylinder, Model 31A8½, direct-reversing, solid-injection marine engines with 8½-in. bore and 11½-in. stroke operating at 540 rpm. Each diesel drives a 72 by 76 in. three-blade propeller through 2 to 1 reduction.

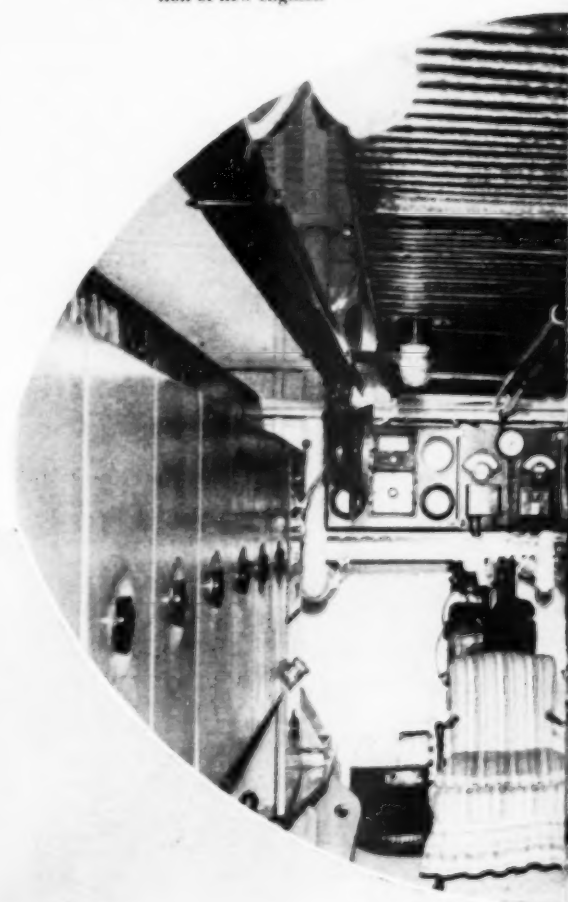
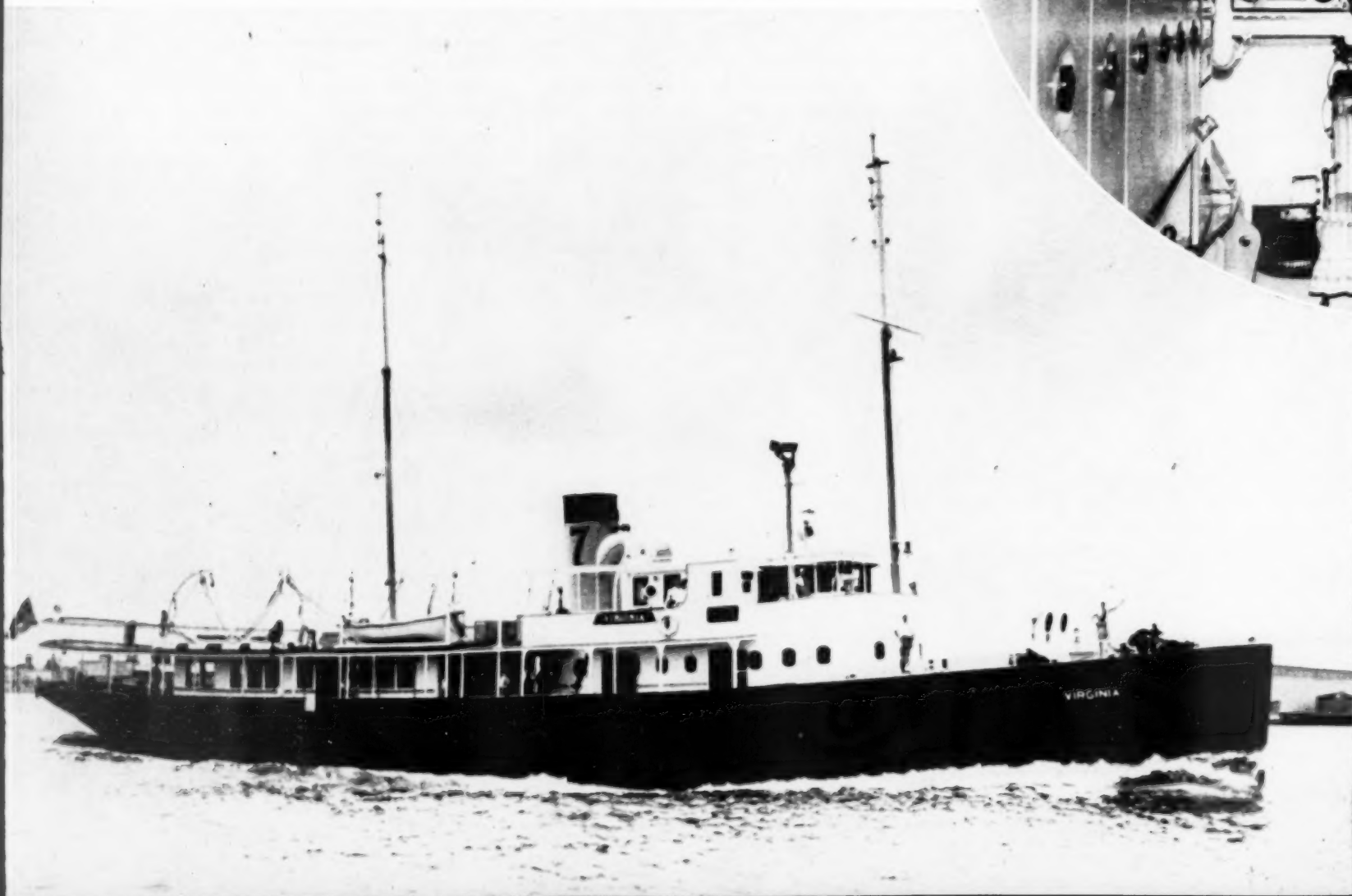
With its new F-M engines the *Virginia* is capable of 14 knots—more speed than it has ever had. The boat's maneuverability is improved, it has more power and engines can be reversed more quickly. The vessel, which has an overall length of 165 ft., a beam of 26.6 ft. and a mean draft of 11 ft., was built in 1925 as a private yacht. Called the *Pawnee* and

constructed by the Newport News Shipbuilding and Dry Dock Co., the boat was typical of that golden era of spending, being fitted with teakwood decks, teakwood staterooms, plush carpets and all the trimmings. It was these lush construction details of the *Pawnee*, renamed the *Virginia* when it was purchased by the Virginia Pilots Association in 1937, which caused the Old Dominion Marine Railway Inc. of Norfolk, Virginia, to abandon the usual method of removing the old engine and installing new propulsion equipment. It was found that the original propellers, shafting and engine foundations could be used without alteration. However, if the engines were to be placed in the hull of the vessel through the topside or deck house, portions of the deck and deck house would have to be removed. With ordinary decking this presents no problem. But teakwood decks are very expensive to replace. The decision was made to remove steel plates from the starboard side of the *Virginia* and slide the engines into the hull through this side opening. Besides preserving the two teakwood decks this means of engine installation eliminated

With its two new 500-hp., Model 31A8½ Fairbanks-Morse engines, the *Virginia* is capable of 14 knots—more speed than it ever had. Its maneuverability also improved with the installation of new engines.

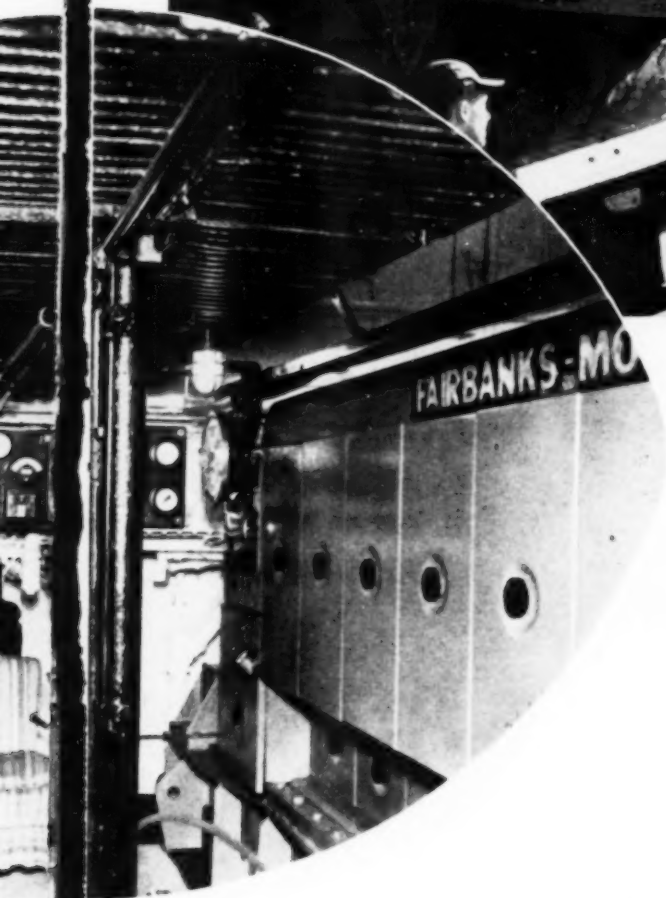
Two 500-hp. Fairbanks-Morse diesels power the Pilot Boat *Virginia* which handles all pilots in the Hampton Roads, Virginia, area. The 165 ft. *Virginia* was built in 1925 as a luxury yacht.

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To avoid tearing up the teakwood decks, difficult and expensive to replace, engineers abandoned the usual method of installing new propulsion equipment and, instead, removed steel plates from the side of the *Virginia* and slid the engines through.



lube oil filter, prelubrication oil pump, intake air filter silencer, exhaust silencer, electrical tachometer complete with drive in the engine room, electrical tachometer indicating instrument for the pilot house and a gauge board.

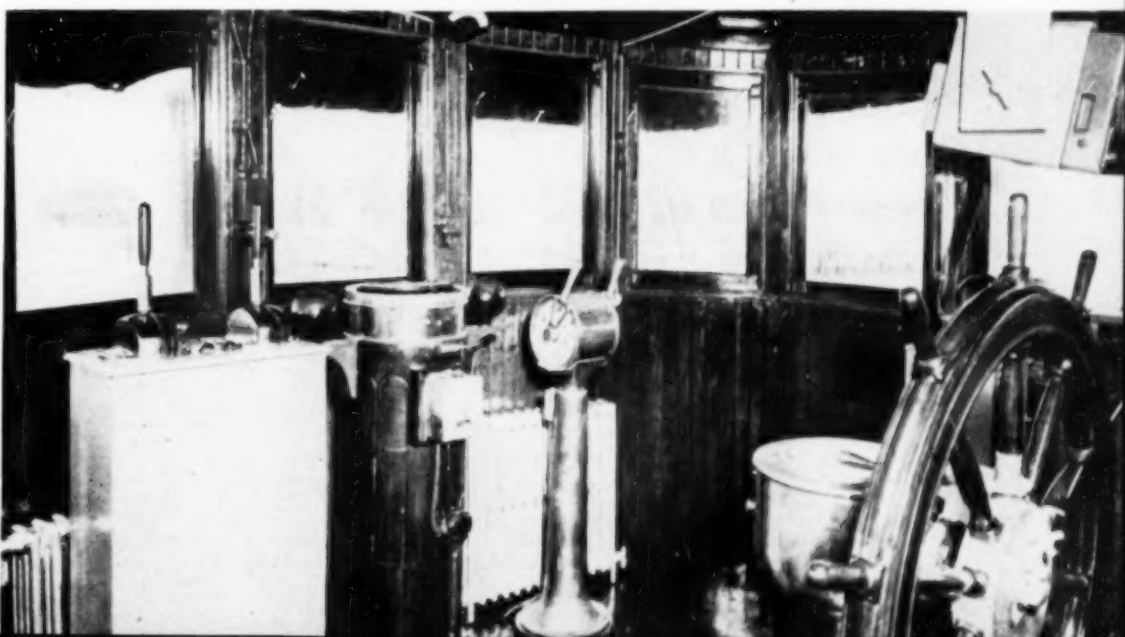
Accessory equipment includes a vertical two-stage air compressor driven by a Fairbanks-Morse 7½ hp. 115 volt type DZM marine motor, three 30 x 96-in. starting air tanks complete with pressure gauge. Safety valve and globe valve, three remote control stands and related equipment. These remote control stands are so located as to give the captain complete control of the boat from any of three stations. There is a control station with electric steering control in the pilot house and on each of the bridge wings there is another.

The Virginia Pilot Association, which operates the *Virginia* and the standby boat *Relief*, is 86 years old. Formed in 1867 it is charged with the safe conduct of vessels entering and leaving the great port of Hampton Roads and other Virginia ports including Hopewell, Richmond and Alexandria. Except for the period of World War II, from 1942 to 1945, when it was made a part of the United States Coast Guard and took up station off the Virginia Capes just beyond the defense barrier, the Association has operated continuously from its station off shore from the Cape Henry Lighthouse. At the present time the personnel consists of 43 pilots and 6 apprentice pilots. In the past 86 years the Virginia Pilot Association has operated a variety of vessels, including several windjammers. The *Virginia*, though, is the pride of the fleet.

the need of removing the deck house and exhaust stack. The procedure resulted in a sizeable saving in the cost of engine installation.

Actually, the Old Dominion Marine Railway, Inc. was the only shipyard in the Norfolk area that could handle this type of installation. In its yards a road runs beside the railway making possible the use of a mobile crane unit. The rigging and crane work involved in the removal of the old engines and installation of two new 500-hp. Fairbanks-Morse engines was done by the E. T. Gresham Co. of Norfolk, Virginia. The engines on the *Virginia* are fitted with a built-in cooling system consisting of a centrifugal jacket water pump, centrifugal all-bronze salt water pump and rotary lubricating oil pump. All the pumps are of the reversible type. Jacket water heat exchangers and lubricating oil coolers complete the cooling system. Each F-M engine is also fitted with a lubricating oil strainer,

This view of the pilot house shows the air brake engine control stand. In converting the *Virginia* care was taken to preserve the original teakwood paneling used throughout.



MOBILE SHOP TRAVELS TO CUSTOMERS

**Reconditioning of Steel Drills on the Spot Saves
Customers Shipping Costs and Minimizes
Lost Time**

IN August of 1952 the Joy Manufacturing Company released to the field its first production models of a $5\frac{1}{4}$ in. percussion-type rock drill known as the "Challenger." This drill is the first of its class and its performance to date has proved exceptional in any type of rock. The drill steels used on this machine have an O.D. of 2 in. and an I.D. of $\frac{3}{4}$ in. At each end, an upset with an O.D. of $3\frac{1}{8}$ in. and an I.D. of $1\frac{1}{8}$ in. is formed and in this upset there is machined a thread to accommodate a connector used to hold two steels together. Because of the size and lengths of drill steels, e.g., some weigh 320 lbs. and are 30 ft. long, there is some difficulty, much expense and lost time involved in shipping them back to the factory for reconditioning when an end has failed in service. This situation is undesirable, especially from the customer's viewpoint. Past practice with smaller drifters has been for each customer to recondition his own drill steel in his own shop. Joy realized the need for cheaper, quicker and better service with these larger steels and the idea of a mobile shop was born. The purpose of the mobile shop is to travel around the country to locations where the Challenger drill is operating and periodically recondition all broken steels right on the spot, saving the customer all transportation costs and lost time normally encountered. The mobile shop was built at the Claremont Plant by the Engineering Department. It consists of a tractor which pulls a 23 ft. x 8 ft. semi-trailer. The side of the trailer swings down into position to form an added working space

11 ft. long and 7 ft. wide. A system of cables and pulleys powered by an AW-80 air winch raises and lowers this platform. The loaded unit weighs 48,500 lbs.

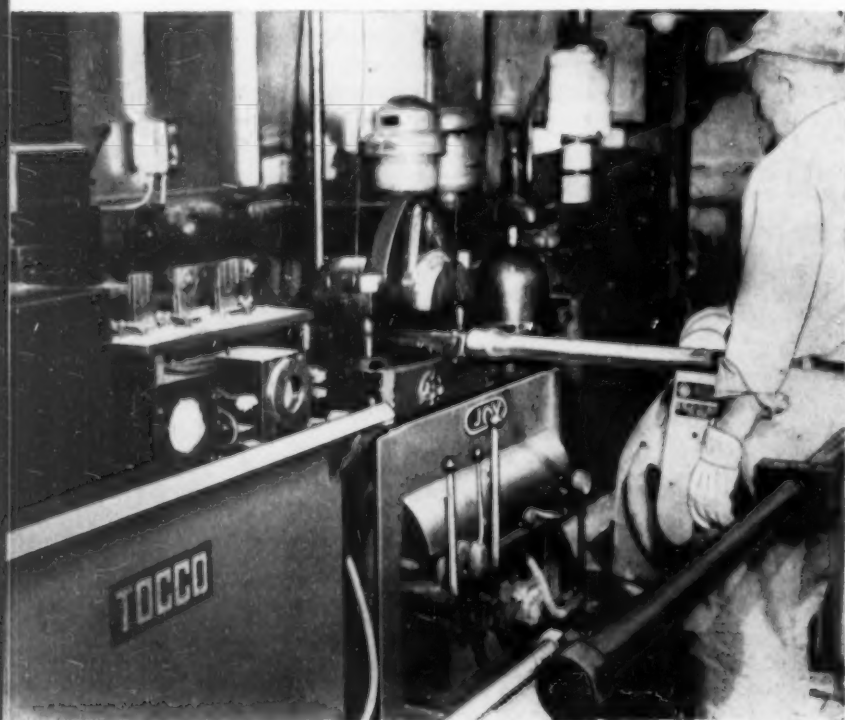
Three sources of power are needed for the manufacture of drill steels on this unit, namely, air, electricity, and water. Air is supplied by a dieselized compressor delivering 210 cubic feet per minute. Electric power is obtained from a diesel-electric generator supplying 250 volts. These two units are mounted on opposite sides at the front end of the trailer and there is a door for each one which opens up to allow air to circulate in from the outside for cooling purposes. The water supply used is a closed system of 20 gallons circulated by a 10 gallon per minute water pump at 50 psi. and cooled by a radiator. This unit is situated in the rear section of the trailer. The machines directly used to produce drill steels are as follows: The steel must be heated to 2150°F-2200°F. prior to upsetting, $9\frac{1}{2}$ in. to 10 in. of the 2 in. round section is heated in a coil by a 20 kw. Tocco air-cooled induction unit at a frequency of 9600 cycles in approximately 7 minutes. The power is automatically timed and shut off when the proper time interval has elapsed. The rod is quickly transferred to the upsetting machine which forges a $3\frac{1}{8}$ in. round upset in 12 seconds. The upsetter consists of a hydraulically-operated clamping device which holds the dies in place while a punch driven by a T-400 slugger drives the steel into the dies. Air cooling of



The Joy Manufacturing Company's mobile shop for on-location reconditioning of drill steels.

the rod in still air follows the forging operation and then it is placed in another large heating coil connected to the same induction unit mentioned previously. Here the steel is heated to 1550°F.-1600°F. in $4\frac{1}{2}$ minutes, again this is automatically done by a series of timers, and allowed to cool in still air. This is done to improve the grain size and machinability which consequently reduces tool costs in the thread-milling operation which follows. After the above normalizing procedure, a 1-23/32 in., 4-pitch, special left-hand thread is machined inside the upset end by a specially constructed milling machine situated near the rear part of the trailer. It is necessary that the steel drills be straight prior to use. If needed, the straightening operation is carried out using a hydraulically operated press, powered by the hydraulic system on the upsetter, and attached to the underside of the trailer on the left-hand side. This is fastened on by hinges and can be swung up under the trailer when not in use.

Used in conjunction with the straightening press are several ball-bearing rollers which can be clamped along the edge of the work platform. The steel is rested on these and turned slowly so that the degree of straightness can be determined. Mounted behind and outside the cab of the tractor is a rack which contains a tank of oxygen and one of acetylene used to cut off the ends of broken drill steels prior to forging new ends. This also can be used for minor repairs or miscellaneous jobs where a cut-off torch is needed. Also located in the trailer between the compressor and the upsetter is a small electric bench grinder used to sharpen bits or tools, or for hand grinding miscellaneous parts as needed. One of the major problems in an operation such as this is the matter of material handling. At present



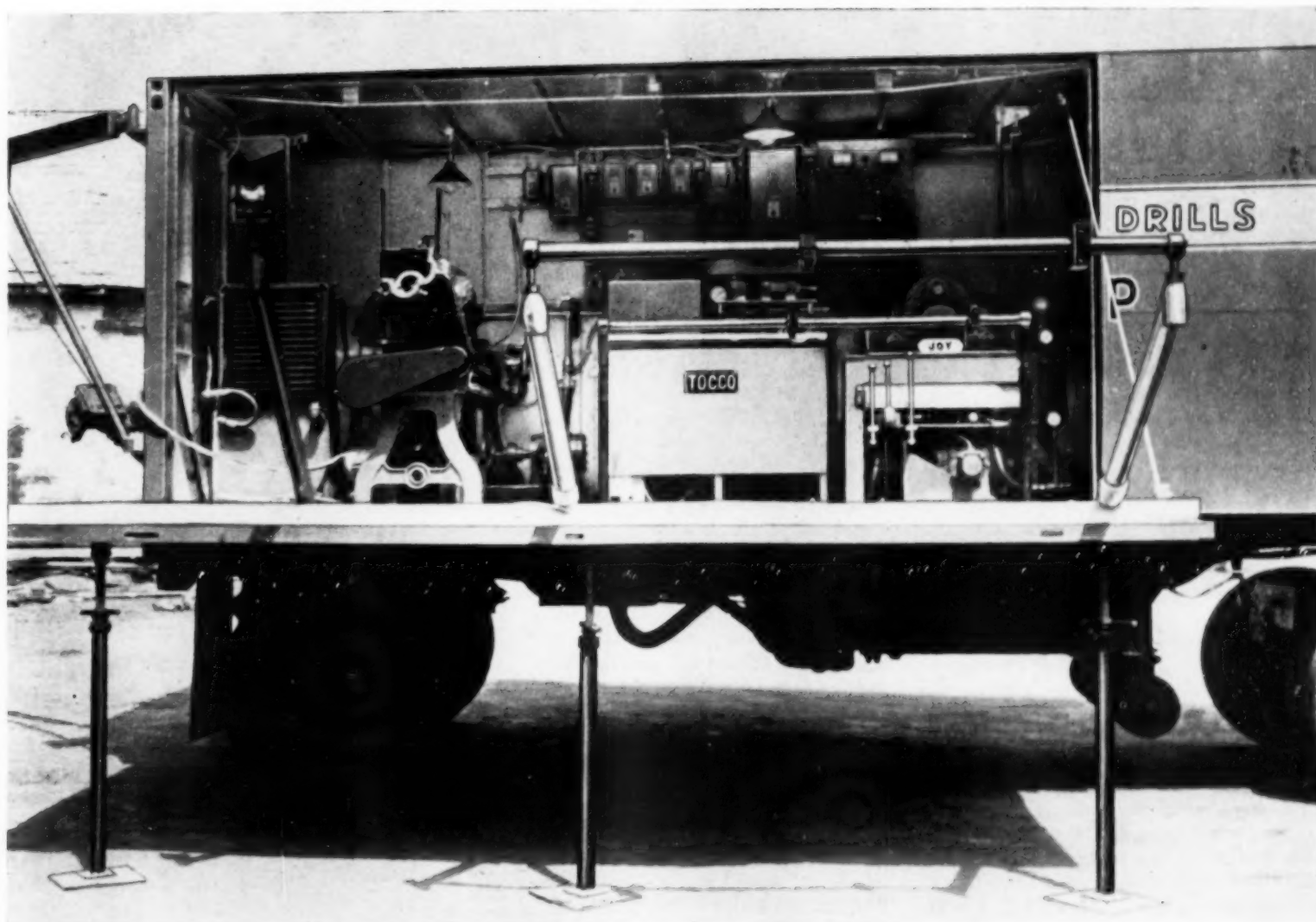
Operator guiding drill steel in upsetter after heating end to 2200°F in Tocco induction heating machine at left. Induction heater uses a Caterpillar D-318 diesel electric generator.



it is necessary to recondition steels varying in length from 50 to 30 feet but averaging 20. These are not only heavy but cumbersome to lift and turn around on the working platform which is 4 ft. above the ground. This problem was solved by rigging up a simple air-operated crane which enables the steels to be lifted to the working platform with a minimum of effort. Detachable steady rests with convenient stops are locked into place and are used to hold the steel in position during all operations.

The crane and steady rests are removed for compact storage when the shop is on the road. Two men can handle the steels from the ground to the working platform and turn them around with ease. The other operations actually require only one man but efficient progress can be maintained by each man knowing his job and the idle one preparing details for the following operation and then helping to move the steel to that operation. Under normal conditions eight to ten steels can be reconditioned in one working day. Apart from equipment and machinery needed to recondition steels, the shop is also equipped with cabinets stocked with tungsten carbide bits and repair parts all of which are used on the Challenger drill. This feature gives the customer quick efficient service on drill parts he may need.

The Joy mobile workshop ready for work. Two diesels supply necessary power, a Caterpillar D-318 and D-315 for operating the diesel-electric generator and Joy compressor.





At the controls of the LTI is Brig. General Paul F. Yount, acting chief of Army Transportation for whom the boat was built. Looking on, from left to right, Navy Capt. S. G. Nichols, inspector of naval material; W. E. Clark, vice president of Dravo Corp.; and Paul Piggott, president of Pacific Car & Foundry Co. Renton, Wash., who built the propellers on subcontract to Dravo.

A RUDDERLESS TOWBOAT

By DOUGLAS SHEARING

A unique river towboat gave a remarkable display of maneuverability in the Ohio River near here last December 8th. The demonstration was staged by Dravo Corporation, builders of the vessel, for Army, Navy and industry representatives. Secret of the vessel's exceptional maneuverability is that it can deliver thrust with equal effectiveness in any direction. There is no need for rudders such as used on conventional screw-type propeller boats. Propulsion is supplied by "sinusoidal vertical axis propellers," relatively new in the U. S. The "business" end of each propeller assembly consists of an arrangement of vertical blades, with controllable pitch, projecting downward from a rotating disc at the base of the unit.

The 150 foot experimental craft was built by Dravo for the Army's Transportation Research and Development Command. This rudderless vessel is the first river towboat in this country to be equipped with such propellers. The propellers used are the largest vertical axis units ever made in the U. S. They measure over 11 feet in diameter. Each of the six manganese bronze blades attached to one disc is four and a half feet long. Called the LTI-2194, (Large Towboat, Inland Waterways) the vessel is a major part of the Transportation Corps Inland Waterways Fleet program to develop equipment

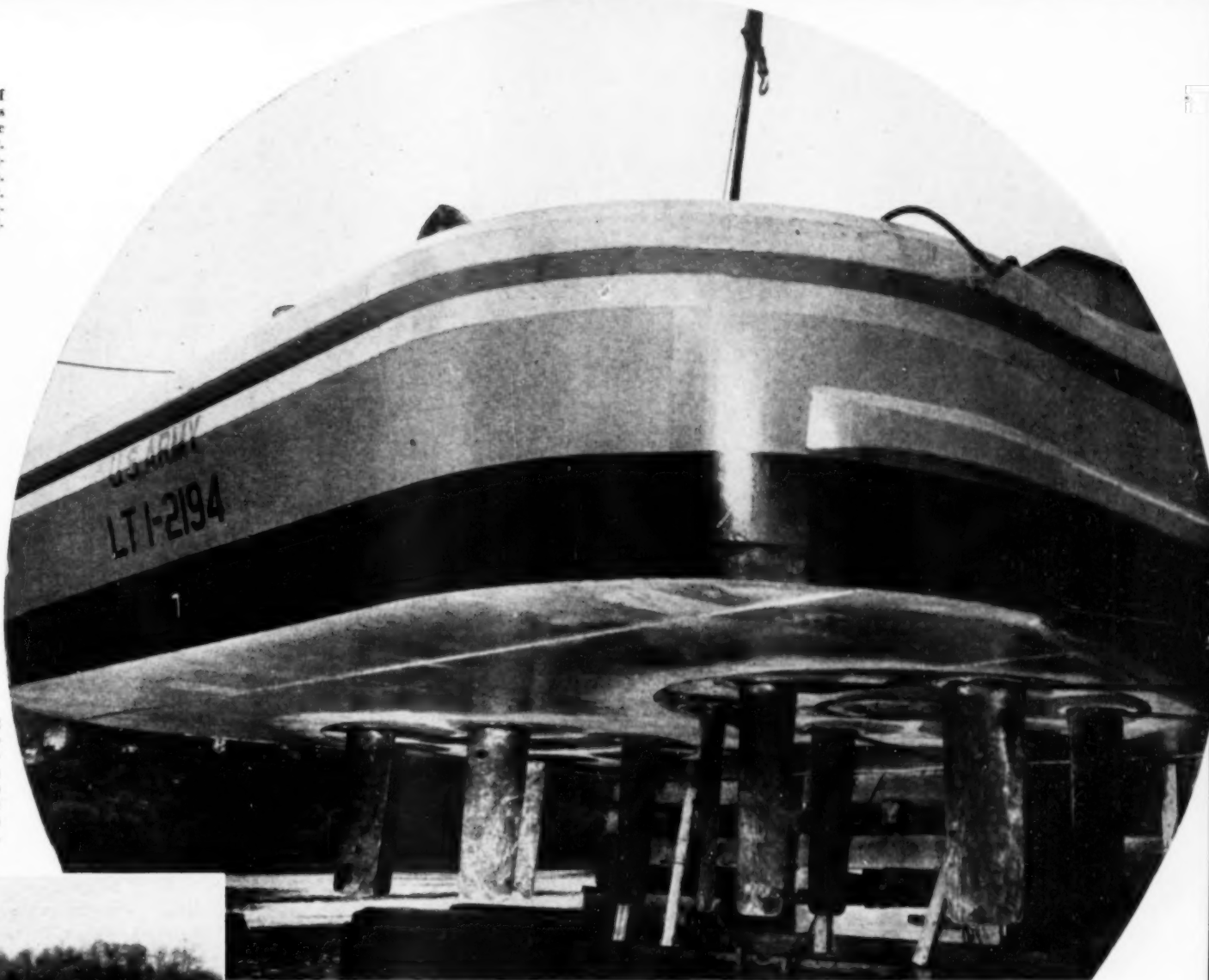
for use on waterways throughout the world. A Transportation Corps study has revealed that such waterways could be utilized to supplement other means of communication, or might be the only access routes, where railroads or highways do not exist or have been destroyed. The LTI-2194 is designed to operate on the principal rivers of the world and, although its characteristics are mainly those of a river towboat, several features make it suitable for navigation in waters not completely sheltered.

A prime factor influencing its design was the requirement for maneuvering heavily-laden barges with positive control in restricted and swift-flowing rivers. The Transportation Corps study indicated that push-towing, as practiced on the rivers of this country, is the most practical and efficient way to move barges. Vertical axis propellers were considered the answer to the problems of maneuverability and control, based on observations of their use in other craft. The Transportation Corps believes this new vessel will be of interest to commercial operators in the U. S. because it is the first river towboat to be equipped with vertical axis propellers in this country. Preliminary designs for the LTI-2194 were developed by the Transportation Research and Development Command, Fort Eustis, Virginia. Final engineering, preparation of con-



The "business ends" of the vertical axis propellers on the LT1-2194 are these blades, each 4½ ft. long, which project downward from the stern. Blades fit into two 11-ft. diameter rotors which revolve as the blades oscillate.

The rudderless towboat displays its maneuverability by making a complete turn within its own length. Power is by two 12-cylinder turbocharged Cooper-Bessemer diesels rated at 1000 shp. each.



struction plans and specifications, and actual building of the vessel were performed by Dravo Corporation. The propellers were designed by Pacific Car and Foundry Company, Renton, Washington and made by Todd Shipyard Corporation, Seattle.

Vertical axis propellers, extensively used in Europe, derive their name from the controllable pitch blades which project downward from the stern and travel in a circular orbit. Each propeller unit is an intricate piece of machinery in itself, weighing approximately 25 tons. The units fit into circular openings in the stern of the boat and are readily accessible from the stern deck for repair and maintenance. Blades can be replaced without drydocking the boat—a feature valuable when the boat is operating in areas where drydock facilities are unavailable.

Shafts from the main engines—each engine is a 12-cylinder, turbocharged Cooper-Bessemer diesel rated at 1000 shaft horsepower—are connected to the rotors through double reduction gears which are built into the propeller assembly. Speed of the engines controls the speed of the rotors which revolve in a horizontal plane as their blades bite into the water. The rotors turn at 76 revolutions per minute when the engines rotate the main shafts at their rated top speed of 900 revolutions per minute. Variations in thrust are obtained by adjusting the engine speed while the blades are automatically pitched for maximum efficiency. Each blade is con-

nected by a rod to an eccentric ring around the rotor shaft. Movement of this ring changes the pitch of all six blades. For steering and flanking, the entire eccentric ring assembly is turned to alter the direction of thrust in any direction around a 360-degree circle. The boat is operated from the pilothouse approximately the same way as any other riverboat. One major difference is the use of two steering wheels, instead of the customary four rudder levers. Main engine controls, all air-operated, are interlocked with the controls for blade pitch mechanism.

The vessel itself is of all welded steel construction with a beam of 32 feet and a normal draft of seven feet. It is designed for a non-stop operating range of 1200 miles—600 upstream against a five-mile-an-hour current, and 600 downstream. The main deckhouse, equipped with watertight doors instead of ordinary doors usually found on riverboats, contains galley, messroom, engine room and four staterooms for officers. Quarters and lounge room for a crew of 10 are located in the forward hold. Immediately behind the pilothouse on the second deck are the captain's cabin and a combination radio-chart room. A radar set and depth-finding equipment are among the modern navigational aids in the pilothouse. The LT1-2194 is equipped for pull-towing as well as push-towing. In addition to steel towing "knives" built integrally with the bow, there also is a power capstan and accessory equipment aft for pull-towing on a hawser.





Kiene test pump connected to nozzle by use of flexible hose. Top of case is used as a receptacle for waste oil. The pump is furnished with rigid and Aeroquip flexible connections.

FIELD TESTING BOSCH PLUNGER FUEL PUMPS

PORTABILITY in any servicing equipment not only facilitates the handling of any work to be done but also minimizes the productive time lost due to equipment being forced out of service. More and more, the tendency is toward the designing of as many servicing tools as possible with the factor of portability in mind. In so doing, the shop becomes available to the equipment in the field with all the subsequent savings from possible loss of expensive machinery which cannot be pulled off the job for any length of time.

One such tool which has helped to move the shop into the field is the new Kiene Portable Hydraulic Test Pump. This unique tool makes possible the field testing of injection systems or hydraulic equipment with the same accuracy and dependability available in stationary shop equipment. The unit includes all the operating advantages of present equipment with the addition of complete portability, light weight, large fuel capacity, precision filters and a patented diaphragm type check valve. Simplicity of operation is a keynote. No bolts or clamps are required to fasten the unit down for leverage. To operate, the hand is placed in a recess and a squeezing action is applied to a lever.

Large 10-micron precision filters supply clean fluid to the test pump and then to the equipment being tested for the protection of both. All foreign-matter larger than 10 microns and a large portion of the smaller particles are screened out. The fuel capacity is large enough to allow for long periods of testing without refilling, a feature which enhances the unit's portability. The fuel tank is manually vented so no leakage can occur while handling or transporting the tester. The three-position valve which is standard equipment makes for greater versatility. In neutral position, this valve connects the pump and gage to the device being tested. In up position, the valve shuts off the gage but leaves the pump connected. This is useful when the gage is not needed or when damage to the gage might occur because of shock pressure. In down position, the valve shuts off the pump and leaves only the gage connected. This is useful in taking leakage readings since it eliminates the possibility of leakage in the tester itself.

Following is the recommended procedure for checking the four and six plunger Bosch fuel pump either on the engine or shop test bench. The test kit described here is for International Harvester

engines. Kits similar to the I-H kit will be made for all popular types of diesels on the market.

1. Before checking the fuel pump, check the engine for compression pressures using Kiene compression tester or some other equally reliable instrument. Test the injector units for opening pressures.

2. After washing off all dirt and grease from the fuel pump area, remove the fuel lines from the fuel pump to the injectors.

3. Means must be available for reading degrees of rotation of the pump and for this, the degree wheel in the Kiene test kit is attached to a coupling or shaft, or degrees are observed on the fly-wheel depending on the engine.

4. Remove No. 1 displacement valve and drop a 1/8-in. ball or any small ball bearing which is smaller in diameter than the plunger unit, on top of the plunger. Replace the displacement valve only and hold it down by hand.

5. Turn the engine over until the ball on top of the No. 1 plunger opens the displacement valve. Note point of valve opening on the degree wheel and turn engine backward until valve is on its top angle seat.

6. Replace valve spring and fittings and connect injector test pump to outlet.

7. Apply 1500 lbs. pressure to valve and note whether gage falls off slowly or quickly. Quick falling off of pressure denotes leakage.

8. Turn engine to where degree wheel denotes raising of displacement valve off angle seat, then continue turning two degrees more and apply 1500 lbs. pressure to test displacement ring part of valve. Test each displacement valve in turn, using the same procedure. The ball bearing is easily lifted out of the plunger unit with a magnet.

9. To test the plunger units the following procedure is used:

The Kiene connector set No. KCK for convenient connection of the test pump to over 250 makes and models of diesel engines.



a. Connect a drip pipe to the supply system of the pump. This may be done by removing the supply line and attaching at that point or by using any similar connection.

b. Remove displacement valves and springs.

c. Attach test pump to discharge of fuel pump.

d. Apply pressure to pump and rotate pump slowly until the pressure rises sharply. The ports are now closed. The pump is turned to three degrees past port closing point and 2500 lbs. pressure is applied to the pump. A beaker is held under the drip pipe and if leakage is more than 15 cc per minute, the plunger should be replaced.

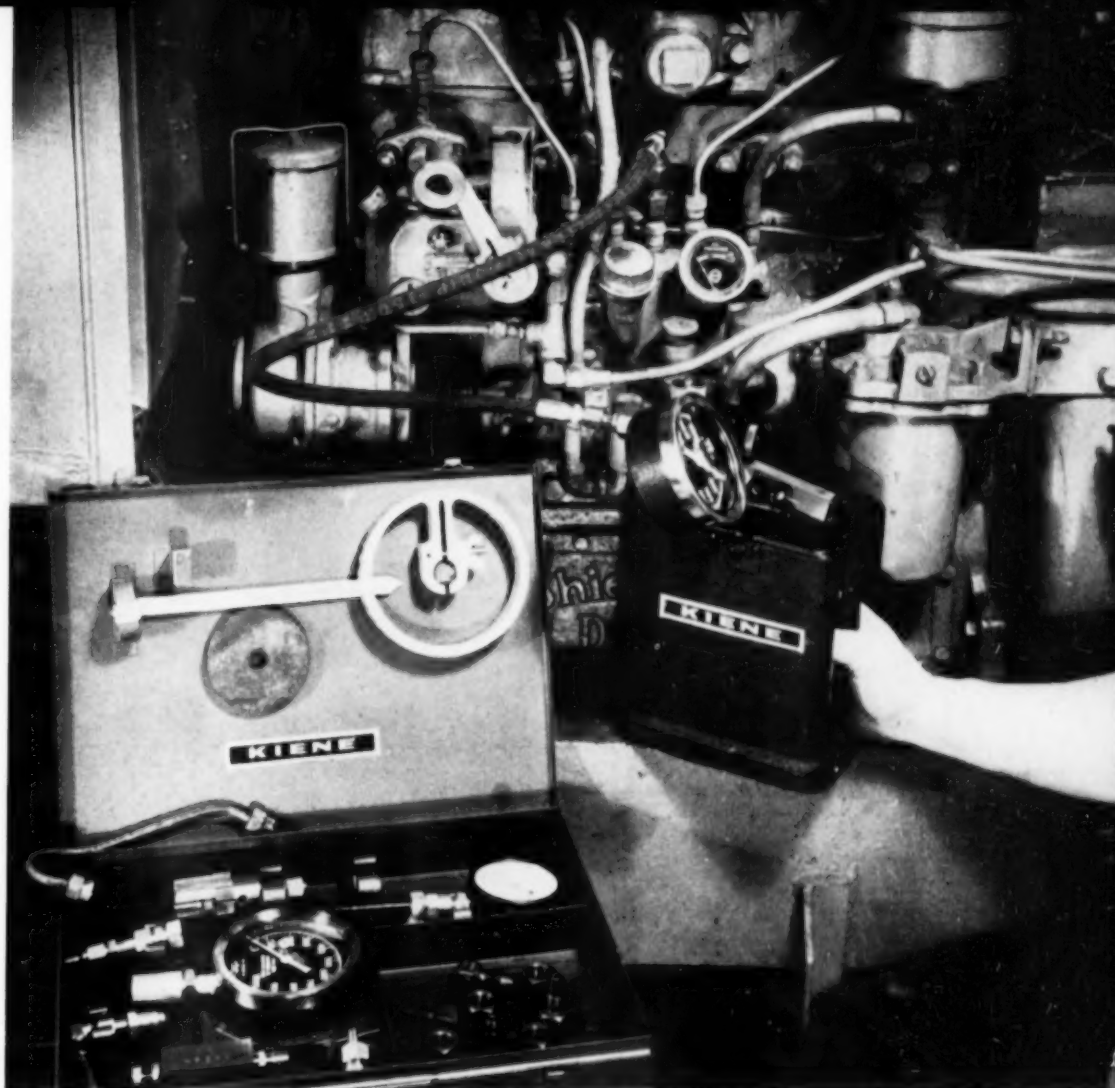
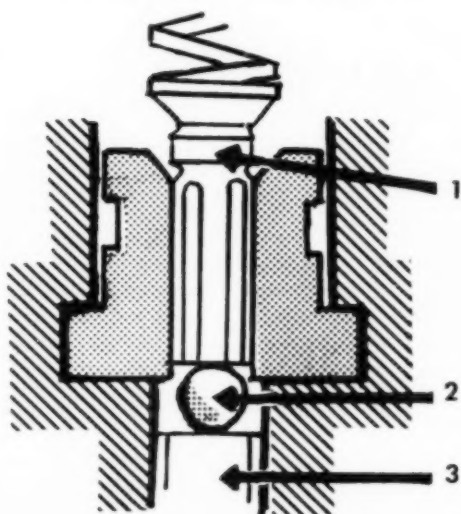
e. Each plunger unit is tested in turn by this procedure.

10. Test for port closing and port opening. This test can be carried out while testing for plunger leakage, or done separately. Port closing should be exactly 90 degrees apart on the four plunger pump and 60 degrees apart on the six plunger pump. The number of degrees each plunger covers between port closing and port opening should be the same.

As an illustration, if the port covering period is found to be 13 degrees at full throttle, all plungers in this pump should be adjusted to 13 degrees port covering. To find the port closing point, pump fuel oil down into the fuel outlet with the displacement valve removed, open the throttle to the full position and when pressure rises on the injector pump gage, note the position on the degree wheel. Continue to keep 1500 lbs. pressure on the injector pump gage and turn the engine forward very slowly. When pressure suddenly falls off you will have arrived at the port opening period, and by noting how many degrees the degree wheel has traveled between port closing and port opening, you can check for even distribution of fuel from each plunger.

11. Replace displacement valves and springs, fuel lines and operate engine. Primary pump pressures should be from 6 lbs. to 12 lbs. Less than 6 lbs. will result in poor plunger loading and lack of power.

The displacement valve check. 1. Displacement valve. 2. Ball. 3. Plunger.



Testing the Bosch fuel pump on a Hercules Model DBOC without removing pump from engine by using the Kiene portable hydraulic test pump. The accessory kit is shown in the foreground.

Summary of Bosch Fuel Pump Check

1. Check engine for compression.
2. Check Injector valves.
3. Check displacement valves for leakage, both at angle seat and displacement shoulder.
4. Check plunger for leakage.
5. Check port closing for 60 or 90 degree spacing.
6. Check port covering for calibration of fuel pump.

By calibrating the fuel pump on the test bench and then checking for port covering by degrees, you can arrive at a figure in degrees by which the same series of fuel pump can be calibrated on the engine with accurate timing and even distribution of fuel. The displacement valve check outlined is illustrated in the drawing to the left.

The function of the displacement valve is to lower line pressure to below 700 lbs. after port opening by the plunger helix. If the displacement shoulder is badly worn, the fuel oil will partly bypass this shoulder and therefore not raise the valve high enough to displace the high pressure in the injector line at the end of fuel injection. This in turn leaves over 700 lbs. pressure on the fuel lines and causes injectors to dribble on the intake stroke of the engine causing a heavy diesel knock, high peak pressures, excess of heat and lack of power accompanied by black exhaust smoke at governed rated speeds and normal loads.

Supplementary Data Field Test — Bosch Pump

Bosch single plunger pumps degree wheel mounted on hub of pump. Plate is removed for this attachment.

Test 1. Test for port closure and port opening for delivery stroke.

2. Test timing sequence between distribution slot and port timing.

3. Test plunger leakage at metering edge. Port closure in main bore and port opening in spill sleeve.

4. Plunger leakage at distributor seal. (Can be repeated for all outlets.)

5. Check discharge valve for seat leakage.

6. Check discharge valve retraction piston leakage.

NOTE: Above tests all made through discharge openings.

For further and more detailed information on the Kiene Test Pump write Kiene Diesel Accessories, Inc., 10352 Pacific Ave., Franklin Park, Illinois. Ask for Bulletin KTP-50.



The Jeffboat, big new towboat for the American Barge Line Company. Propulsion is by two Fairbanks-Morse 10-cyl. OP diesels each developing 1600 hp. at 720 rpm.

THE "JEFFBOAT"

New 3000-hp. Towboat for American Barge Line Company

NEWEST towboat to join the American Barge Line Company fleet is the *Jeffboat* completed by ABL's subsidiary, Jeffersonville Boat and Machine Company. The pride of both the owners and the builders in this new river giant is evidenced by her name. The Jeffersonville, Indiana shipyard became known as Jeffboat early in its spectacular career during World War II. No detail of the design or selection of equipment was too small to receive the full attention of Jeffboat's engineers and ABL's operating supervisors. Every feature was planned for maximum efficiency and minimum maintenance. A full sized "barge line" boat, the Jeffboat has over-all dimensions of 160 ft. x 35 ft. x 12 ft. with fully loaded draft of 8 ft. 6 in. carrying 75,000 gallons of fuel or a 20 day supply.

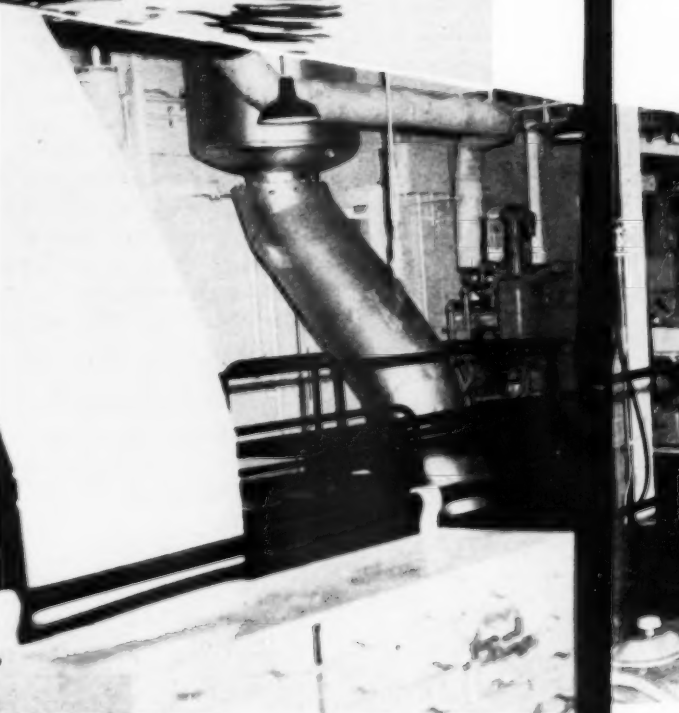
The hull is heavily framed and bulkheaded for rugged service. The lines of the double-chine mid-section, the modified scow bow and the tunnels were laid out by Jeffboat, after consultation with Prof. L. A. Baier of the University of Michigan, to achieve maximum towing efficiency and flow of water to the wheels and nozzles. Shell plating is

$\frac{3}{8}$ in. throughout with $\frac{5}{16}$ in. deck plating except in way of the engine room which is $\frac{3}{4}$ in. To achieve maximum strength and rigidity at the stern of the boat the main deck is raised 3 ft. 4 in. for a distance 20 ft. over the wheels and this portion of the hull is very heavily framed and bulkheaded. There is a notable absence of vibration in the new boat at all speeds and under any load.

The superstructure is also of all-welded steel construction using a $\frac{3}{16}$ in. plate. Interior joiner bulkheads are $\frac{5}{16}$ in. tempered masonite. Rock wool insulation is installed on all exposed bulkheads and decks for comfort summer and winter.

All interior and exterior doors are flush type constructed of waterproof plywood. All windows are Truscon double-hung steel sash with the exception of the forward pilothouse windows which are bronze Kearfott design.

Quarters are provided for the crew on the first and second decks with the captain's cabin and office on the Texas deck just aft of the pilothouse. Quarters



are provided for a total of 22 plus a guest cabin or spare, sleeping two. The crew's lounge is located in the main deck house and the officers' lounge on the second deck. All the cabins are roomy and well ventilated. Quarters for the cooks are located just aft of the galley at the stern of the boat. Two laundry rooms are included, one housing the American Cascade washing machine and the other the mangle and electric clothes dryer. Any part of the boat can be reached by inside passageways; a great convenience and safety factor in bad weather. Decks throughout the quarters are covered with Vinyl plastic tile.

Powering the new boat are two Fairbanks Morse, 10 cylinder opposed-piston diesels each developing 1600 hp. at 720 rpm. The engines drive the propellers at 200 rpm. through American Blower Corp. hydraulic couplings and Farrell-Birmingham 3.5:1 horizontal offset reduction gears. The 8 ft. diameter four blade Coolidge steel propellers turn in Kort nozzles designed and built by Jeffboat. All inside surfaces of the Kort nozzles are stainless-clad steel. The propeller shafts are 8½ in. diameter manganese-vanadium steel forgings. The stern tube and strut bearings are meehanite castings with bronze liners and are lubricated automatically by an Alemite Monitrol greasing system.

The engines as well as all the machinery on the boat were designed for the greatest efficiency and economy and for minimum maintenance. Fuel is passed through a Briggs filtration unit before going to the engines. All cooling water for the main engines is circulated through a single Patterson-Kelley shell and tube type jacket-water cooler. Raw water and jacket water pumps are engine-driven. The large Burgess-Manning exhaust silencers and the Maxim intake silencers on the main engines, together with the Johns Manville acoustical board and insulation reduce the noise level in the engine room to a minimum.

The main engines are fully controlled from the pilothouse using Westinghouse Air Brake controls for throttle and reverse and automatic operation of the shaft brakes. A duplicate Westinghouse control stand is provided on the main deck in the

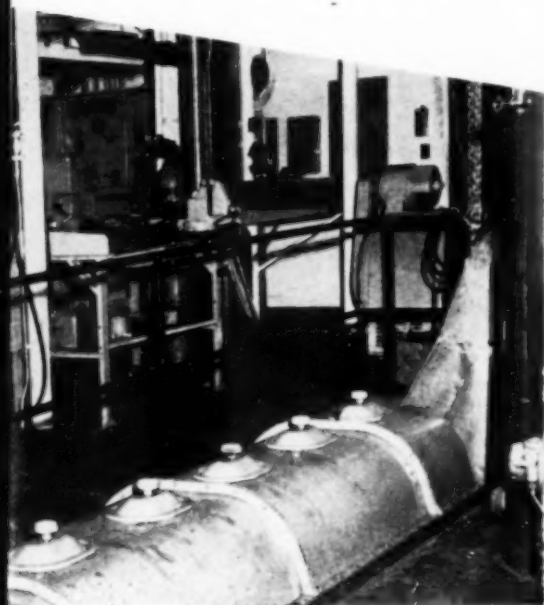


The pilothouse showing the console with Westinghouse Air Brake main engine controls.

engine room. Machinery other than the main engines and accessories includes two Ingersoll-Rand 15 hp., 3-stage air compressors, and an American Marsh 15 hp. fire and bilge pump. Power for auxiliaries and lighting is supplied by two Caterpillar D-13000 diesel-generators, each rated 75 kw., 440 volt, 3 phase, 60 cycles. The two generators are located on the main deck at the forward end of the engine room for maximum ventilation and accessibility. One generator engine is arranged for electric starting and the other for air starting to assure operation under almost any circumstances. The modern dead-front switchboard with generator synchronizing panel, circuit breakers, switches for auxiliary machinery and alarms, is located at the forward bulkhead of the engine room. Lighting circuits are 110 volt single phase which is provided

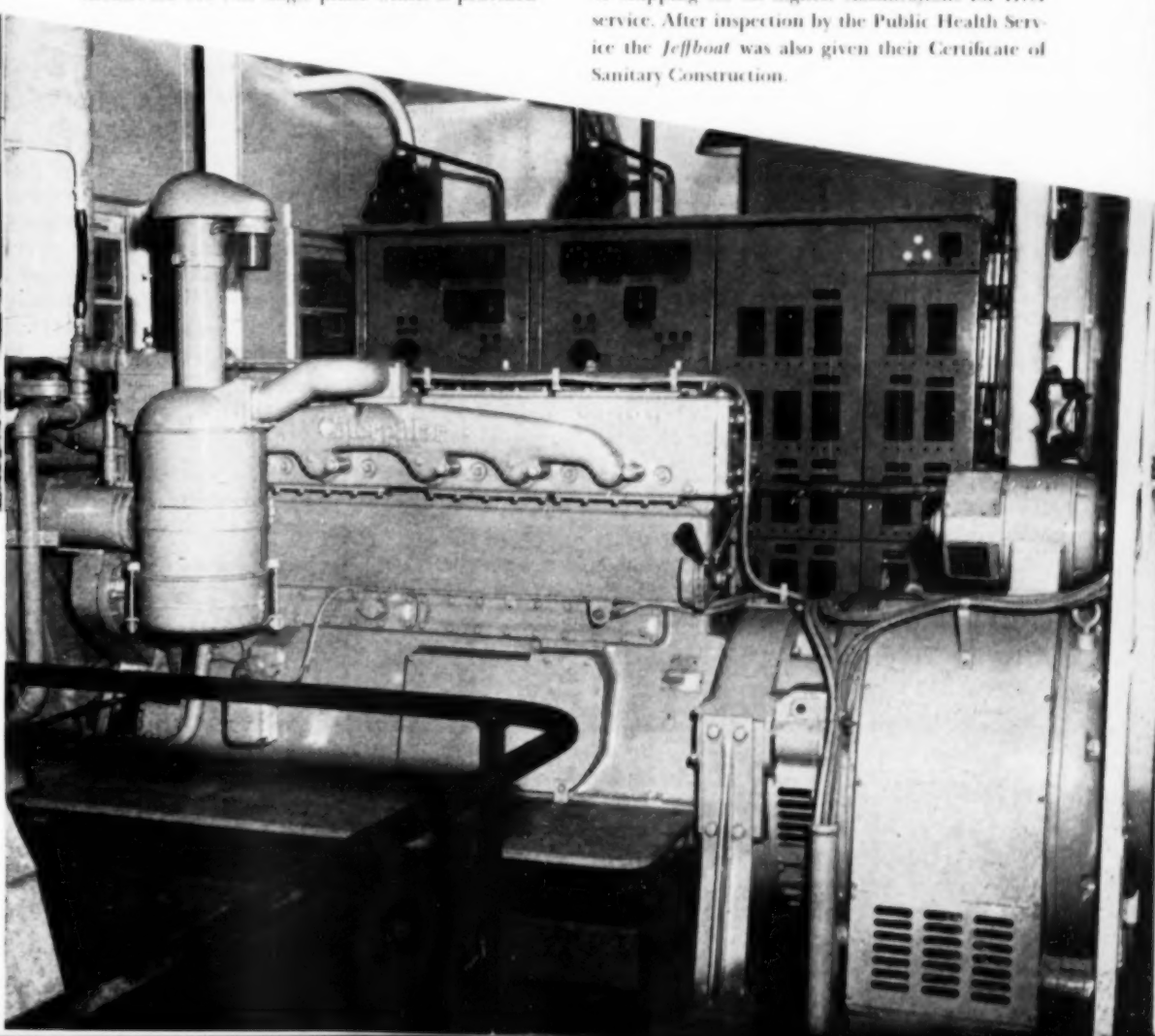
by a 15 kva. transformer. All wiring on the boat is installed in accordance with AIEE Bulletin No. 45, Electrical Installation on Shipboard.

The spacious pilothouse is fully equipped with a 16 in. RCA radar set and an RCA ship-to-shore radio telephone. Two Carlisle & Finch 19 in. 45 amp. searchlights are located on top of the pilothouse and are supplied with dc. power by 300 amp. Lincoln Electric motor-generator set. A 7-circuit Henschel running light panel is also installed in the pilothouse console. The air horn is a Kahlenberg 8 in. Commander. Communications between the pilothouse and engine room is by means of Hove-McCann sound-powered telephone. The *Jeffboat* was built under survey by American Bureau of Shipping for its highest classifications for river service. After inspection by the Public Health Service the *Jeffboat* was also given their Certificate of Sanitary Construction.



View of upper engine room looking forward toward the main switchboard. The top of starboard main 10-cyl. Fairbanks-Morse engine is visible. The fuel filters are by Briggs.

One of the two Caterpillar diesel generators, 75 kw., 440 volt, 3 phase. The main switchboard is seen in the background.



ENTERPRISE DIESEL SERVICE...



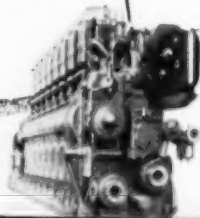
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Ross Exchangers are also integral components of many other Caterpillar Diesel Engines supplying power for oil field drilling rigs, pipeline construction jobs, earth moving machinery, ditches and work boats.

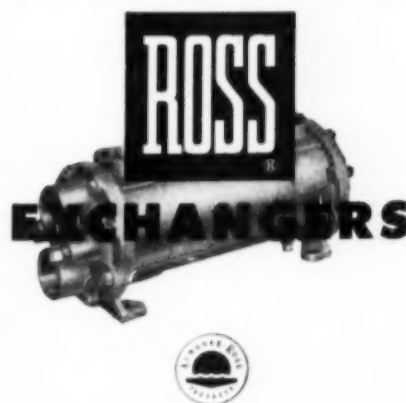
Ranked first for high thermal efficiency and ruggedness by first-ranking equipment builders, all-copper and copper alloy Ross Type BCF Exchangers are pre-engineered, fully standardized and promptly available. For more information, request Bulletin 1.1K5.

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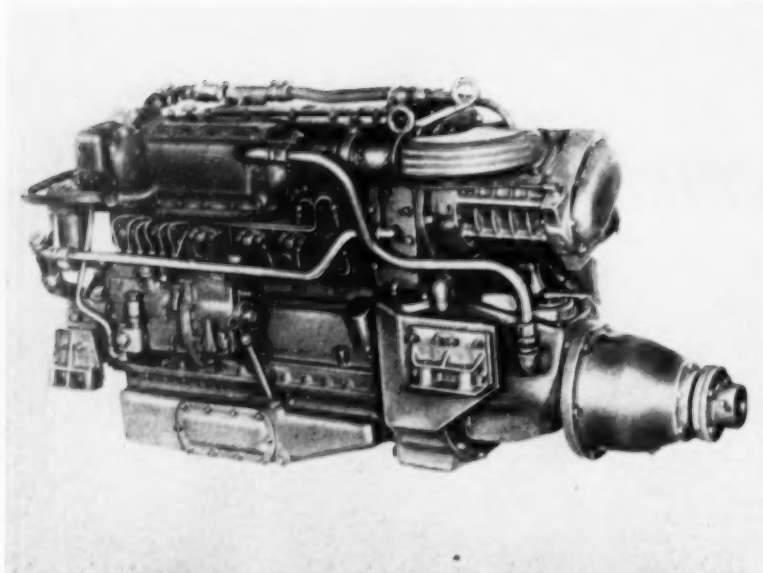
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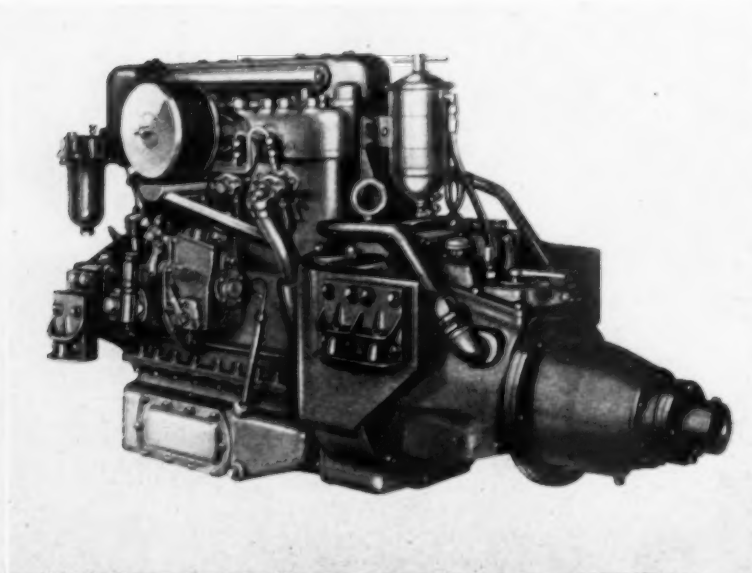
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The Hercules Model DIX6ES, 6-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, with Michle-Dexter supercharger. It is rated at 150 hp. and has a weight of 1490 lbs.



The Hercules Model DIX4E, 4-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, rated at 75 hp. and has a weight of 890 lbs. Note Bosch fuel pump.

NEW MARINE DIESEL ENGINES

HERCULES Motors Corporation is now marketing a line of marine diesel engines with horsepower ranging from 12-500. The new Hercules marine diesel engines feature compact size, light-weight design and are produced for high-speed, heavy-duty service. These marine diesel engines are available for powering pleasure craft as well as working vessels.

To meet the varying requirements of the marine industry the new Hercules marine diesel engines are offered in many different models and specifications. For instance Hercules marine diesels are available with direct drive or reduction gear, dual water pumps, keel-cooling or heat exchanger, supercharged or natural aspiration and hydraulic or manual reverse gears. Standard features include rubber mountings, hydraulic reverse gear, direct

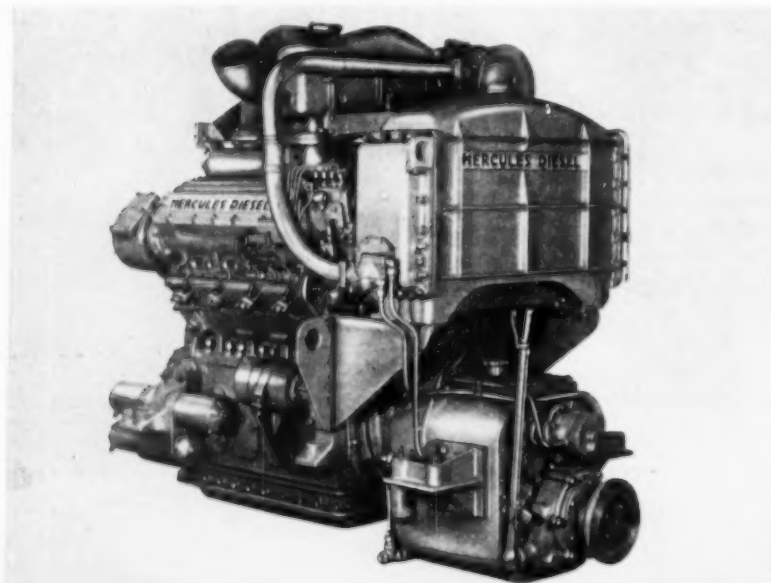
drive, propeller coupling, cold starting aid, sheave-type power take-off as well as the many special features of Hercules engines. Various marine engine accessories are also available.

In addition to the added factor of safety derived from the use of fuel oil, Hercules marine diesel engines produce many operating economies, according to the manufacturer. Initial savings in fuel oil combined with more power per gallon of fuel used, provides double economy. Equally important as fuel economy these Hercules diesels operate satisfactorily on either No. 2 or No. 1 fuel oil. This not only further reduces fuel costs but also provides greater accessibility of fuel oil as No. 2 fuel oil is more readily available and costs less than No. 1 fuel oil. This factor thus extends the applicability of these engines.

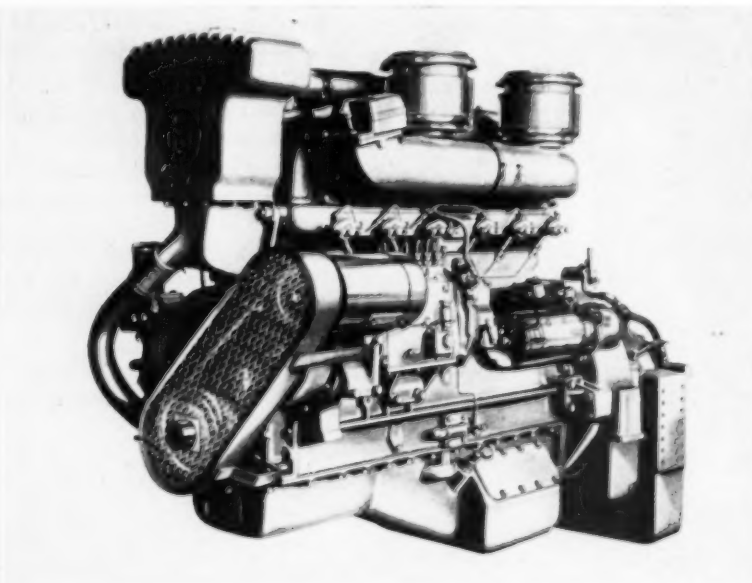
The following models will be exhibited at the Chicago Boat Show: Model DIX4E, 4-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, 75 hp. at 3000 rpm. Model DIX4ES, 4-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, 95 hp. at 3000 rpm.; Model DIX6E, 6-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, 105 hp. at 3000 rpm.; Model DIX6ECS, 6-cyl., 3 $\frac{7}{8}$ -in. bore by 4-in. stroke, 150 hp. at 3000 rpm.; Model DFXH, 6-cyl., 5 $\frac{3}{4}$ -in. bore by 6-in. stroke, 250 hp. at 2100 rpm.; and Model DNX-V8TS, 8-cyl., Vee 6 $\frac{1}{4}$ -in. bore by 6-in. stroke, 500 hp. at 1800 rpm.

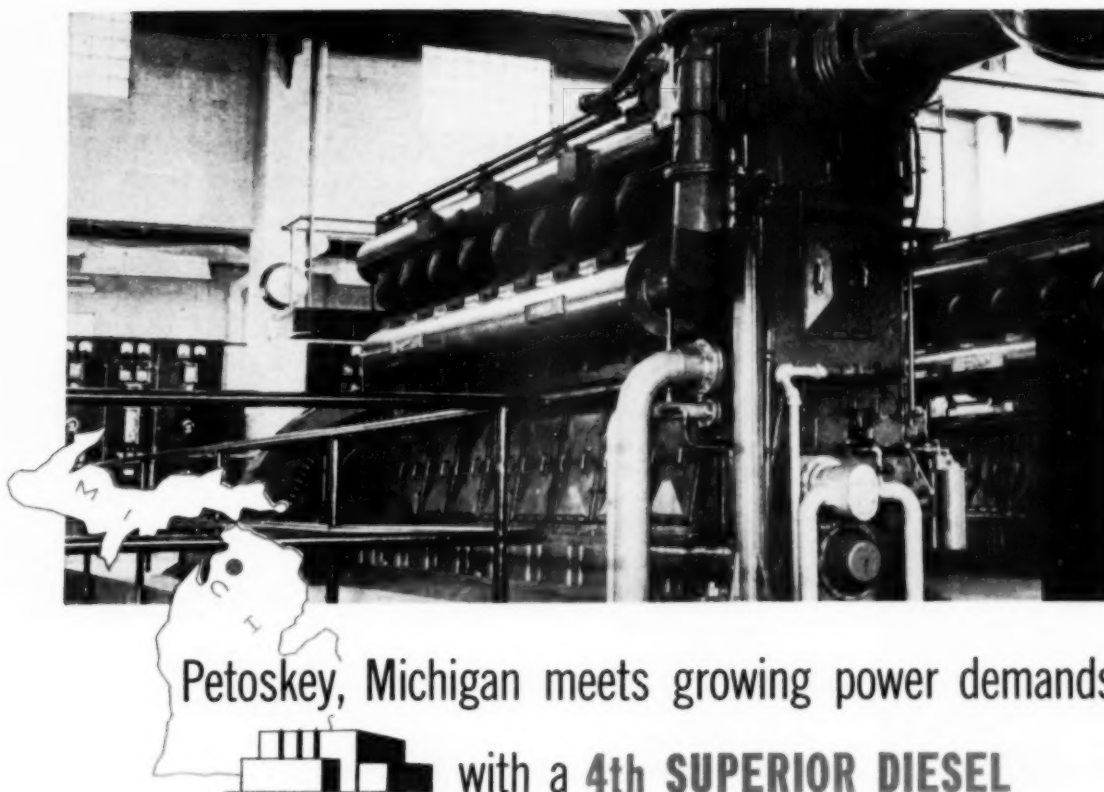
The Model DIX6ES is typical of the Hercules line of marine diesel engines as it is of interest to both work boat and pleasure craft owners. This particular model represents a low weight to horsepower ratio. The DIX6ECS produces 150 hp. and weighs 1490 pounds.

The Hercules marine diesel Model DNX-V8TS, 8-cyl., "V" 6 $\frac{1}{4}$ -in. bore by 6-in. stroke, rated at 500 hp. Weight is 7600 lbs.



The Hercules Model DFXH, 6-cyl., 5 $\frac{3}{4}$ -in. bore by 6-in. stroke, rated at 250 hp. Weight is 4500 lbs.





...Profits gained from 3 present Superior Diesels pay for it!

Petoskey, Michigan, had sufficient power for the first time in many years when it installed 3 Superior Diesels in a new \$570,000 power plant in 1948. At that time, city officials and engineers, wisely planning for possible future power loads, allotted engine room space for expansion.

Their foresighted planning is really paying off—for Petoskey's power requirements have increased 27.5% since 1948 and kept the first 3 Superiors in full operation. The addition of the new 1765 HP Superior now provides the extra margin of power needed to easily handle the normal daily peak load.

The most important fact about the Petoskey plant is that the city is paying for this new Superior

from profits made possible by the original three installed. The city's experience with Superior performance in providing economical power through several years of near-peak loads quite naturally led to the choice of this new engine for extra power demands.

In thousands of other communities like Petoskey, in all parts of the world, Superior and Atlas Diesels are constantly solving power problems. The facts and figures on these Superior and Atlas Engines reveal the full story of proven power. For complete details on how Superior and Atlas power can work for you, contact any one of the Engine Division offices listed below, or write Springfield, Ohio.

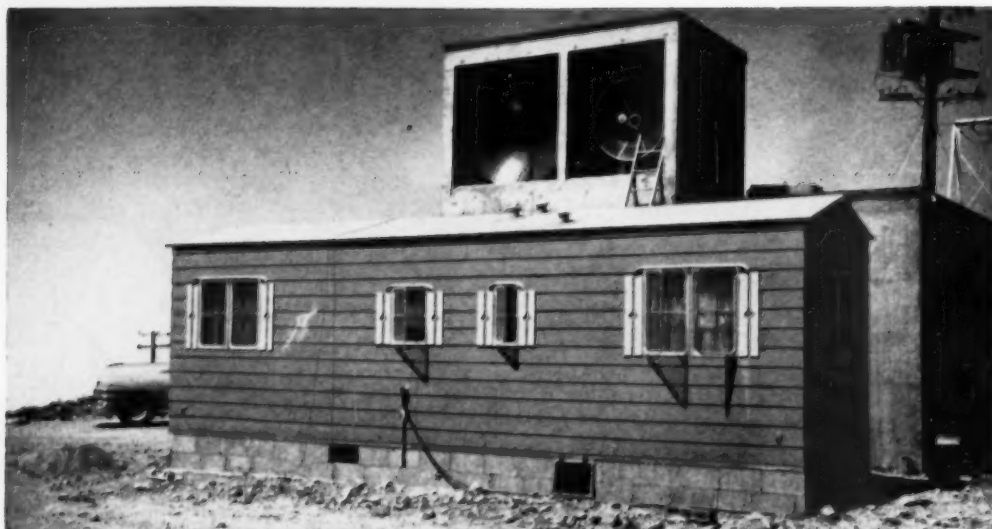
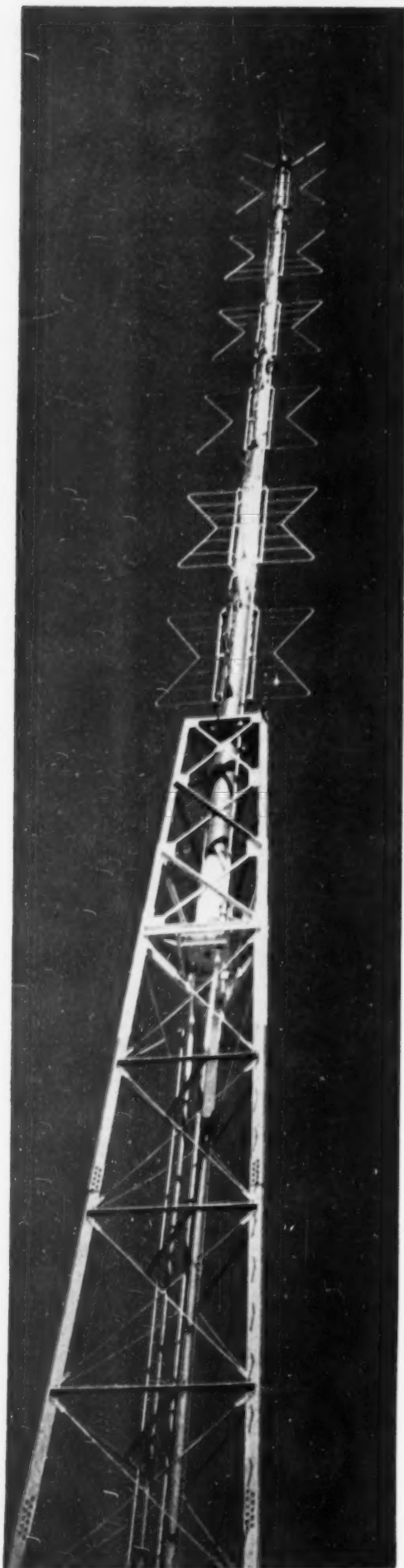


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A CIVIL DEFENSE INSTALLATION



KEY-TV transmitter near Santa Barbara, California. A Caterpillar D318 diesel electric set used as emergency source of power is housed in a building separate from the control room.

POWER INSURANCE

SANTA Barbara, California's new television station, KEY-TV, which began operations in mid-1953, has insured itself against interrupted service by installing a Caterpillar diesel electric set equipped with automatic starting facilities as a source of stand-by power. The studios for KEY-TV are located on a hill just north of the picturesque city of Santa Barbara and overlook the town and the beach which curves along the rolling waters of the Pacific. These studios, of octagonal design, provide modern and beautiful operational facilities for the staff.

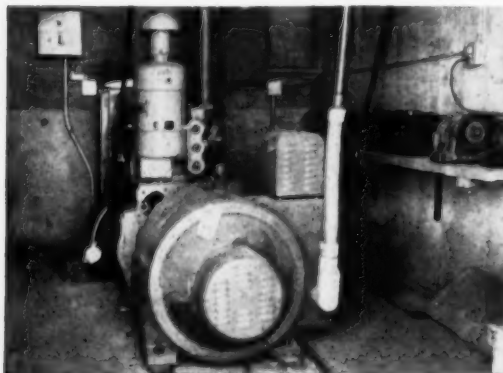
The transmitter is located on a peak one mile east of Santa Ynez Peak at an elevation of 4,000 ft. The 200 ft. RCA super turnstile antenna is equipped with six batwings and has an effective radiated power of 50,000 watts visual and 25,000 watts aural.

The signal from KEY-TV reaches north to Salinas, Calif., and south to Mexico. The station has a 45 kw. load and the voltage requirement for its stand-by diesel electric set is 230 volts, three phase, 60 cycle current to power the 8,000 watt visual and

4,000 watt aural RCA transmitter. For future operation, a very simple adjustment of the transmitter is required to switch to color transmission.

Because their transmitter is located at the tip of a power line, and at an elevation where ice sometimes forms up to three inches thick on the lines, station KEY-TV has anticipated commercial power failures, especially during the winter months. To guard against such occurrences which would take the station off the air, interrupting both service and revenue, it installed its stand-by power at the time its facilities were built. The stand-by 100 hp. Cat D318 engine powers an EM generator located in a soundproofed room adjacent to the control room. Upon failure of commercial power, the Cat diesel engine will automatically start and produce maximum power within a few seconds. This fast starting is facilitated by the use of a jacket water heater and battery charger for the 24 volt diesel engine starting system. This automatic stand-by plant was engineered for station KEY-TV by Joseph G. Moore Co., Caterpillar dealer at Santa Maria, California.

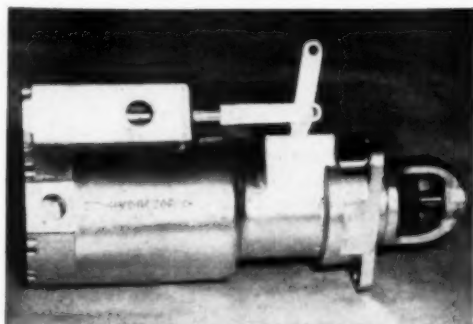
The Cat D318 diesel electric set which supplies power in the event that the commercial source is cut off.



Control board at KEY-TV transmitter. With an emergency source of power, communications can continue in the event of disaster.



Hydrotor Distributor Appointed



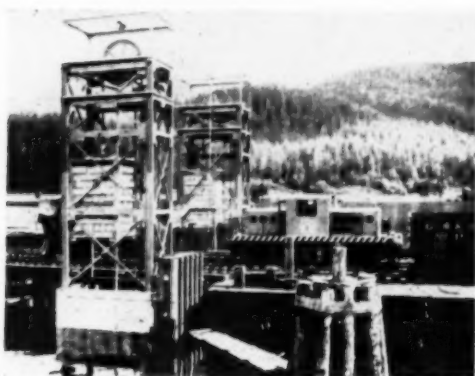
The Hydrotor cranking motor.

The Rucker Co., Oakland, Calif., has been appointed distributor in the seven western states, British Columbia, Alaska, and Hawaii, for the Hydrotor, a newly developed hydraulic cranking system. The Hydrotor is a hydraulic cranking motor designed for use on diesel and gasoline engines. It is particularly adapted for use on farm, industrial, marine and military equipment.

Advantages of the Hydrotor include efficient, dependable cranking at all temperatures in all climates; higher cranking speed with less bulk and weight; and full protection while operating in hazardous areas. New unit is constructed entirely of aluminum and bronze, requires a minimum of maintenance. It may be used with either a recharging or hand pump. Speed may be adjusted as desired.

A six page, two-color folder, giving a detailed description of the three models of the Hydrotor and its many advantages for heavy engine equipment may be obtained by writing to The Rucker Company, 4228 Hollis Street, Oakland, California.

Industrial Expansion in Alaska



Arrival of the first locomotive and railroad cars, marks the start of the industrial expansion of Southeastern Alaska. The Baldwin-Lima-Hamilton Corp. 50-ton diesel electric unit, purchased by the Ketchikan Pulp Company of Ward Cove, is being transferred from barge to ferry slip at the end of its long journey from the States.

Top Salesmen

Fourteen salesmen from Stewart & Stevenson Services, Inc., one of the nation's largest distributors of General Motors diesel engines, were listed among the top 18 in the final W. T. Crowe Diamond

Award standings for leadership in GM diesel sales during 1953. Ray Loden placed first in the standings for the Detroit Diesel Engine Division's Central Southwestern sales zone which includes Texas and Oklahoma. Mr. Loden also placed first in standings released earlier in the year. Other Stewart & Stevenson salesmen in the top 18 are N. N. Elkins, Emmett Dobbs, M. McInnis, L. L. Howell, Grady Foster, R. O. Brehm, C. Pratas, W. E. Rutledge, A. B. Grant, Joe Rucker, E. E. Childress, R. E. Spriggs, and J. Ellis.

Penflex Data Book

The scientific application of flexible tubing for air, oil, steam, gases, and volatiles—is explained in an

eight-page illustrated book just published by Pennsylvania Flexible Metallic Tubing Co. The various Penflex products are catalogued and pictured; steel, bronze, and aluminum tubing and hose in many types of construction; blower and ventilation hose; tar and asphalt hose; tank car hose; diesel piping; marine unloading hose; electric conduit; rivet passers; and barrel fillers. They are also shown in application photographs. Complete engineering data on all Penflex tubing and couplings make this book extremely valuable to purchasing agents, industrial designers, product engineers, and equipment supervisors. Free copies of "Penflex Engineering" may be requested on your company letterhead. Write to Penflex, 72nd Street and Powers Lane, Philadelphia 42, Pa.

FROM 100 K.W....

UNION Diesel generating sets are conservatively designed, carefully built and dependably rated. They provide more reliable power at lower cost. Installations both afloat and ashore throughout the world have proved that their use assure maximum, long-lived economy with minimum maintenance.

Applications include stand-by service with automatic controls as well as main line power source with high load factor.



UNION Diesels are available to suit your requirements arranged as

Dual Fuel
Full Diesel
Sparked Gas

...TO 1250 K.W.

The UNION DIESEL ENGINE Company
2121 DIESEL ST., OAKLAND 6, CALIFORNIA, U. S. A.

FOR MORE SERVICE YEARS

Atlantic Flexible Metal Hose



- For **VIBRATION DAMPENING**
CORRECTING MISALIGNMENTS
EXPANSION, CONTRACTION
of Diesel Exhausts, Air, Fuel Lines
- For **VENTILATING HOLDS**
- For **LOADING & UNLOADING**
Oils, Molten Chemicals, Refrigerants,
Light or semi-solids

SEAMLESS OR INTERLOCKING CONSTRUCTION
BRONZE, STEEL, STAINLESS STEEL— $\frac{1}{4}$ "-36" I.D.
with fittings as needed.

Write for Bulletin 1020.
See our Catalog in Sweet's File
for Product Designers and
Mechanical Industries.

ATLANTIC METAL HOSE CO., INC.
302 Dyckman St., New York 34, N. Y.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 18 of **DIESEL ENGINE CATALOG** which is now available, entirely revised and rewritten. This is the 18th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the **DIESEL ENGINE CATALOG** gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS

816 N. LA CIENEGA BLVD.
LOS ANGELES 46, CALIFORNIA



INTRODUCING to the railroad industry, the NEW....

EXCEL-SO FEQ-5

COMBINATION WATER SEPARATOR, MICRONIC FILTER FOR DIESEL FUEL

Stop injector corrosion, erosion, wear and tear, and seizures caused by water and dirt in diesel fuel. . . . This new combination separator-filter is installed directly on the fuel supply to injectors on diesel locomotives, to assure effluent purity of stream to 99.995% and to remove water and solids down to 5 microns at 35-45 F. Cuts maintenance costs, down-time and expensive injector overhaul due to contaminated fuel. One injector change costs more than the FEQ-5 and its installation. Takes up a minimum of space (22" x 18" x 8"), cast aluminum construction, universal mounting brackets, standard connections.



5 GPM - Rated Capacity

WARNER LEWIS COMPANY

BOX 3096 • TULSA, OKLAHOMA

Florida Diesel News

By Ed Dennis

LITTLE DAVID and *Gulf Coast*, 2 twin screw 40 ft. fast oil field cruisers powered with GM 4-71's from Kennedy Marine Engine Co. of Biloxi, Miss. for use in oil field work. They also supplied the two GM 6-110's on the 85 ft. *Jelmecia* for Off-Shore Marine Service.

RECENTLY launched for the Army Transportation Corp.'s the *F. S. R. 791*, a new type refrigeration vessel measuring 222 ft. by 38 ft. and powered by two 700 hp. Superior diesel engines.

VANS Diesel Service of Key West is the new authorized service representative for General Motors diesel engines in that area, operated by Herbert Van Derven, a licensed engineer who was formerly employed at the Miami branch of Fla. Diesel Engine Sales, General Motors Corp.

FOR the Dominican Republic, a 500 gpm. Worthington water pump, powered by a model 3-71 General Motors diesel, for irrigation on a banana plantation; supplied by Auto Marine Engineers.

FROM Florida Georgia Tractor Co., the Miami Water Works Dept. secured a model H. R. D. Hough Payloader powered with a model DIX-6D Hercules diesel rated at 70.5 hp. with a 14 in. single dry plate clutch.

CUMMINS Diesel Engines of Florida repowered the yacht *Merwin* with two model NHRMS Cummins diesels rated at 300 hp.; Capital hydraulic gears were also included in this fine installation.

FOR the Hialeah Crushed Stone Co., a two-cyl. series 71 General Motors diesel, Harrison radiator cooled, to wash crushed rock; a GM 6-71 provides power for the rock crushing machine. From Florida Diesel Engine Sales, Miami.

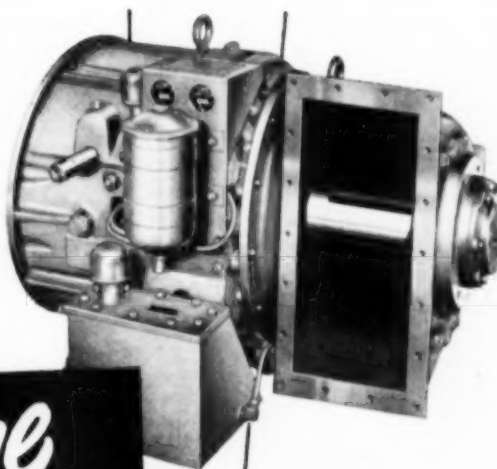
THE Stribbling Bros. Machinery Co. branch at Gulfport, Miss., Caterpillar distributors, are doubling their shop space with a 7000 sq. ft. concrete building. This expansion was necessary due to the ever increasing use of diesel engines in this area.

THE *Gulf Mistress*, a 73 ft. twin screw shrimp, is the first of 6 new trawlers for the Walpace Co., and the first deep sea trawler built at Pensacola, powered with two D13000 Caterpillar diesels and Snow Nabstedt reduction gears, a 6 hp. Hallett diesel generating set for auxiliary purposes.

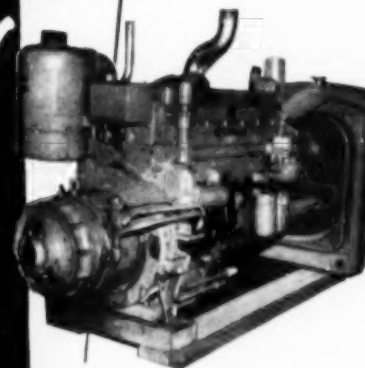
SHELLEY Tractor & Equipment Co. "packaged" the 68 ft. trawlers *Big Dahlia* and *Little Lorraine*, powered with Caterpillar D17000 diesels for C. J. Reilly of Key West plus the *Gulf Pearl* and *Richards* with D13000 diesels for C. C. Newman of West Palm Beach.

FLORIDA Diesel Engine Sales, G. M. Corp., will feature the twin screw cruisers *Jimmy D II* and *Jimmy D III* in an actual water demonstration at the Miami International Boat Show Feb. 19th through 24th; the former has the inclined 4-71 diesels, the latter the 4-51 series.

Caterpillar D337 engine (below) equipped with Model CF Torque Converter, Twin Disc Industrial-Type CF Converter (right) available in three sizes, with seven capacities each to handle any type gas or diesel engines from 40 to 1,000 hp.



Torque Converter Drive
for your
New Power Unit



Here's what the "Twin Disc-equipped complete Torque Converter Power Unit" provides:

- Picks up heavy loads smoothly without slipping the clutch.
- Multiplies engine torque up to 6 times.
- Absorbs shock loads . . . saves clutches, engines, drive line components.
- No mechanical connection . . . drives through fluid action.
- Engine operates in maximum efficiency range at all times.
- Automatically matches power to load demands.
- Permits "hovering" or holding under power.

Next time you talk to your engine dealer about that new power unit, ask him about supplying you with a complete Power Unit equipped with a Twin Disc Torque Converter.

Find out how a small additional investment will return multiplied dollars in greater performance, faster work cycles, lengthened equipment life, easier and more efficient operation . . . with Twin Disc—the Torque Converters that have set the pace throughout industry. Contact your engine dealer . . . today!



TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

Heat and Vibration Resistant Metallic Bellows

Titellex, Inc., of Newark, New Jersey announces it is starting commercial production of its welded-diaphragm type of metallic bellows in a variety of standard production sizes and in any one of several different metals. Originally developed for atomic energy application, the special construction of this bellows, state Titellex engineers, gives it long life under severe conditions of corrosion, vibration and high temperature. Hence it is finding wide application as a shaft seal, expansion joint and vibration absorber in the aviation, ordnance and chemical fields. Analysis of failure of conventional metal bel-

lows by Titellex engineers showed that failure occurred mainly at the bend in each convolution, due to the concentration of flexing at this point during expansion and contraction of the bellows. This flexing concentration led to work hardening and consequent failure of the metal at this point.

The welded diaphragm construction, Titellex engineers point out, distributes flexing over the entire height of the convolution, thus avoiding the concentration of flexing and the resultant work hardening that leads to bellows failure. They point out that this construction also affords the following advantages over the bellows of conventional construction: 1) Flexibility can be increased by increasing

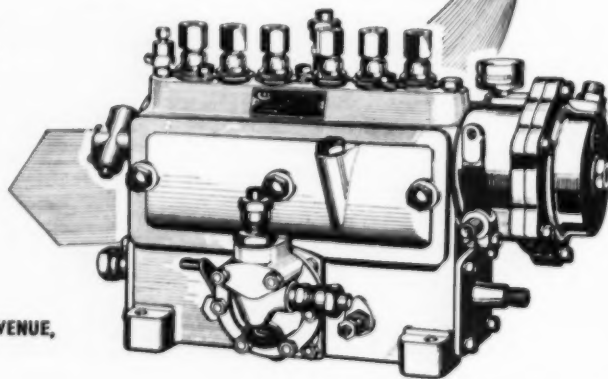
the height of bellows convolutions. This permits producing a bellows having the great flexibility required for lines conveying gases or liquids at low pressure. At the same time, this great flexibility can be attained with metal of sufficient thickness so that these bellows for low pressure lines can withstand the high external pressures such lines are often subjected to. 2) The increase of flexibility with height of convolution also permits much greater expansion range for every inch of bellows length than is possible with conventional bellows construction. Thus relatively long expansion ranges can be achieved in bellows of comparatively short initial length.



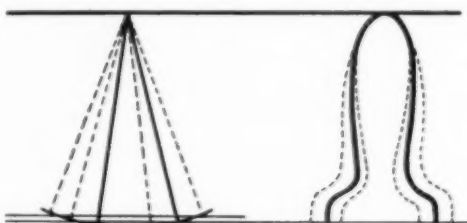
The world's largest manufacturers of Fuel Injection Equipment for diesel engines

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CLEVELAND 7, OHIO.



Fuel Injection and Electrical Equipment



Conventional bellows (left) concentrates flexing at bend in convolution. In Titellex welded diaphragm bellows (right) contoured diaphragm causes distributed flexing, as in cantilever spring.

Titellex manufactures two types of bellows using this new construction. The "standard" type, consisting of a series of male expansion elements, and the nesting type, comprising a series of nesting male-and-female expansion elements for extreme flexibility applications. Tables of available sizes in both types are given in Titellex Bulletin No. 300 describing this bellows. The bulletin is available on writing to Titellex, Inc., 500 Frelinghuysen Avenue, Newark 5, New Jersey. Both the standard and nesting type bellows may be obtained in a variety of metals (stainless steel, Monel and Inconel) to suit the particular application or operating conditions.

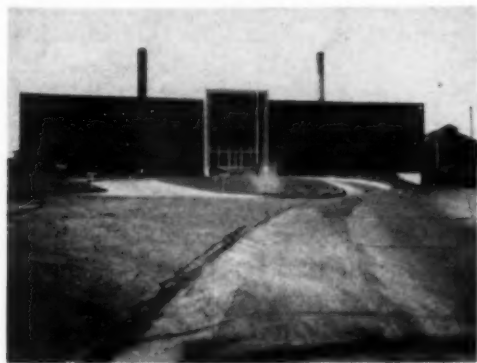
High Heat Resistant Paint

"Thermalite" is the name of a new high-heat aluminum paint already put to wide use in the diesel industry. Made by Tropical Paint & Oil Co., Cleveland, Ohio, Thermalite was developed for use on metal surfaces with temperatures ranging from 400 to 1000 degrees. It has been found to be an excellent finish for manifolds, exhaust stacks, and other areas where high heat is a problem. Formulated with a special heavy silicon content, Thermalite "fuses" to the surface, will not discolor, blister, flake or burn off and gives exceptional protection against severe weather, according to Van M. Darsey, Tropical president.

He stresses the fact that Thermalite, which is available in both interior and exterior formulations, should not be used where temperatures are less than 400 degrees, since metals with heat problems below 400 degrees can be well protected by the standard Tropical Elastikote heat-resisting aluminum paint, at lower cost. In addition to railroads, many diesel users, as well as more than a thousand industrial plants, are now using Thermalite for many interior and exterior high-heat applications.

Complete information can be obtained from Tropical Paint & Oil Company, Cleveland 2, Ohio.

Opens New Office Building



Pictured above is the new office building of Erie Forge & Steel Corp., Erie, Pennsylvania. This well-designed brick and concrete building measures 177 ft. by 77 ft. and is completely air-conditioned. The building was erected on what was formerly a vacant piece of ground to the left of the gate-house on Erie Forge & Steel Corporation property.

In conjunction with the opening of the new office building, an open house of the entire plant was held. Visitors to the plant were shown the entire process of producing crankshafts, forgings, castings and the many other important pieces of machinery essential in diesel manufacturing and heavy steel machinery. The plant tour included stops at the 100-ton open hearth furnaces, the 12,000 pound steel hammers, gigantic forging presses and the tremendous machine shop that is one mile long and 70 feet wide. In this shop, visitors witnessed the process whereby forgings are machined into the various finished items with high precision and accuracy.

The opening of Erie Forge's new office building represents another step in the company's 80 years of continuous growth.

General Sales Manager



Appointment of Marshall R. Chambers as general sales manager for Kent-Moore Organization, Inc., is announced by D. R. Abbey, vice president in charge of sales. Since joining the organization in 1947, Mr. Chambers has served as advertising manager and assistant general sales manager. In his new capacity, he will be responsible for the development of the company's newly inaugurated jobber sales program. The company is a leading manufacturer of special automotive service tools and equipment.

International in Agreement With Heil

International Harvester Company, continuing its program to round out a full line of equipment in the industrial and earth-moving industry, announced an agreement with the Heil Co., of Milwaukee, which will enable Harvester to manufacture two-wheel rubber-tired industrial tractors for use in heavy construction work. The announcement

was made jointly by Joseph F. Heil, president, The Heil Co., and Harald T. Reishus, vice president, International Harvester Company, and executive head of his company's industrial power division. The arrangement between the two companies is covered by a contract under which Harvester acquires Heil patents covering two-wheel tractors. In addition, Harvester acquires designs and manufacturing data which will materially shorten the time otherwise required by Harvester to engage in the production of the tractors. Under the agreement Heil will supply Harvester with two-wheel tractors for an interim period until Harvester begins the manufacture of tractors, and Heil will also manufacture certain types of scrapers and wagons

for Harvester during the period of the agreement, which continues for a number of years.

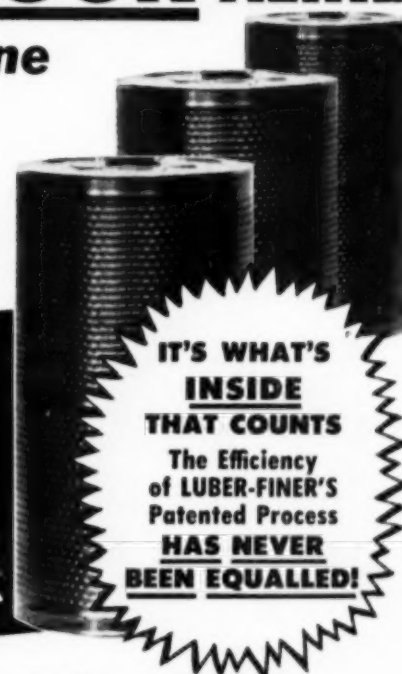
Two models of such tractors are currently being built by Heil. Combined with either scrapers or wagons, they have been marketed as "Heiliners" through Heil's sales organization. They will now be sold through Harvester's industrial power division and a worldwide network of distributors under Harvester's trade name "International." This additional product fits well into Harvester's manufacturing pattern of diesel engines, crawler tractors, and earth-moving machinery, providing a more fully-rounded line of International industrial power equipment for the construction industry.

FILTERS MAY LOOK ALIKE

But **ONLY** Genuine

Luber-finer
PACKS

Give the Results
Enjoyed by
**MILLIONS OF
SATISFIED USERS
THE WORLD OVER**



**IT'S WHAT'S
INSIDE
THAT COUNTS**
The Efficiency
of LUBER-FINER'S
Patented Process
**HAS NEVER
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DON'T BE MISLED BY PRICE ALONE!

There is NO substitute for DIESELPAC'S Patented Filtering Process for H. D. Compounded oils AT ANY PRICE. The DIESELPAC cleans more oil faster—keeps it CLEAN longer—and gives more service and better engineered protection than any other filtering element. It PAYS to get the BEST!

✓ PROTECTS ENGINE

The DIESELPAC is designed to remove not only ABRASIVES but also CONTAMINANTS such as moisture, carbon, acid, etc. from oil, and is engineered to keep the filtering media and the removed contaminants from migrating back into engine. The DIESELPAC assures continuous protection that reduces engine wear and maintenance costs far beyond that possible with other types of filter elements.

✓ EXTENDS PERIODS BETWEEN DRAINS

The DIESELPAC collects and holds even the most finely dispersed contaminants without affecting or removing compound additives from the oil. A glance at the dip stick will show that the oil is CLEANER—symbol of better lubrication and longer oil life enjoyed only by Luber-finer users.

✓ TAKES LESS OIL

The DIESELPAC because of its engineered construction requires 2 to 4 quarts less oil than spongy substitute filter elements being offered for use in the Luber-finer housing. This is an additional saving enjoyed when using the DIESELPAC.

STANDARD of the INDUSTRY SINCE 1936

Since Luber-finer was first introduced to the public in 1936, it has gained worldwide acceptance by millions of satisfied users everywhere. Luber-finers are approved by major oil companies and petroleum engineers. Luber-finers are standard or optional equipment on America's foremost stationary engines, diesel trucks, tractors and earth-moving machinery.

LUBER-FINER PACKS AVAILABLE:

1. REFINING PACK—Introduced to the public in 1936 for use with straight mineral oils, fuel oils and inhibited industrial oils.

2. DIESELPAC—First made available in 1941, the DIESELPAC was primarily designed for use with H. D. detergent compounded oils under the direction of Dr. Ulric B. Bray, B.S., Ph.D., F.A.I.C., internationally known Petroleum Chemist. The DIESELPAC has also achieved outstanding results when used with fuel oils and straight mineral oils.

**GET THE
FACTS
FREE!**

Why take chances with expensive equipment? **WRITE TODAY** for complete information on what to look for before you buy either Filters or Replacement Packs—see how you can save many dollars and hours in maintenance.

LUBER-FINER, INC., 2512 S. Grand Ave., Los Angeles 7

Codrington Honored

Past president George M. Codrington of Cleveland, O., was honored for his long service and active leadership in the National Association of Engine and Boat Manufacturers. A testimonial dinner, held at the Columbia University Club in New York City, was tendered Mr. Codrington by the members of N.A.E.B.M.'s executive committee.

Mr. Codrington, who retired as president last January after serving in that capacity since 1943, was presented with a silver tray with the signatures of executive committee members who had served under him. John W. Milford, of Detroit, his successor as president, made the presentation. In addition to his activities as president of the N.A.E.B.M. for 10 years, Mr. Codrington was active on the Association's Exhibition Committee which directed the seven post World War II National Motor Boat Shows in New York's Grand Central Palace and headed that group in 1952 and 1953. Under his leadership the shows from 1947 to 1953 heralded a new era in the tremendous growth of recreational boating in America.

At a business meeting preceding the dinner, Mr. Reynolds was appointed a member of the executive committee to replace Scott J. Matthews, who retired as the Association's representative from The Matthews Company. William T. Crowe, Detroit, Mich., was also named to the committee to fill Mr. Codrington's unexpired term. Mr. Reynolds is vice president and treasurer of The Matthews Company. Mr. Crowe has been general manager of the Detroit Diesel Engine Division of General Motors Corp. since the organization of that division in 1937 and has been affiliated with General Motors for more than 30 years.

Service Tool Guide



A completely New Service Tool Guide for all GMC gasoline and diesel-powered trucks, both light and heavy duty, has just been released by the Kent-Moore Organization, Inc., Detroit, leading manufacturer of special automotive service tools and equipment. Designed to help the truck service man find the special service tool he requires to do any job in the shortest time with the least amount of effort, the profusely illustrated Guide contains description of tools and their applications that are recommended for every service operation.

Special sections of the 52-page book cover: front axle, rear axle, cab and body, brakes, clutch, cooling, electrical, engine (gas), engine (diesel), fuel system (gasoline engine), spring suspension, steering, mechanical transmission, hydra-matic transmission, hubs and wheels, and shop equipment. You may obtain a free copy by writing to the Advertising Department, Kent-Moore Organization, Inc., 5-105 General Motors Building, Detroit 2, Michigan.

New Factory

Work has started on the construction of American Bosch Corporation's new branch factory in Columbus, Mississippi. General contract for the plant was awarded to Brice Building Company of Birmingham, Alabama. The new factory of approximately 100,000 sq. ft. is scheduled to be completed by April 1, 1954 and production will start immediately thereafter. Initially it will be used to manufacture some of the company's high volume automotive products such as voltage regulators, electric windshield wipers, and small motors. W. C. Robinson, American Bosch vice president, is in charge of the Columbus operation.

American Bosch will continue to manufacture its precision diesel fuel injection equipment, aircraft components, and other electrical products in its main plant in Springfield, Massachusetts. Increase in demand for American Bosch products has necessitated the construction of the new plant.

CUT DOWN



CLUTCH COSTS

ROCKFORD clutch engineers are helping product designers reduce costs — by making possible quicker clutch assemblies, easier clutch adjustments, and after-sale clutch service unnecessary. Because ROCKFORD CLUTCH precision, capacity and stamina are greater than ever, product owners' up-keep costs are lower. Now is the time to have ROCKFORD clutch engineers give your product the benefits of lower clutch costs plus competitive operating advantages.



Send for This Handy Bulletin

Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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Rigs and Pumps

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STAYNEW DRY TYPE INTAKE FILTERS NEED NO SERVICING!

Only Staynew Intake Filters have the ability to remove air-borne particles without the necessity of viscous filter aids. The *dry-type* filtering medium becomes even more efficient as it accumulates dust. Resistance increases very slowly with use. Staynew filters frequently operate two or more years without attention. When cleaning is indicated, a brush or simple vacuum tool is all you need. There are no oil reservoirs to clean and refill—no oil coatings to renew.

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ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

OVERSPEED GOVERNORS

TO SHUT DOWN AN ENGINE AT A
PREDETERMINED R. P. M.



SYNCHRO-START Governors are provided with adjustment for increasing or decreasing the shut-down speed while engine is running.

They are made to standard SAE dimensions of a battery ignition distributor. They may be mounted in a distributor take-off or may be driven by some rotating shaft on the engine thru a standard SAE coupling or gear. Governors can also be furnished with Angle Drive Attachment for belt, chain or gear drive or Governor Head can be supplied for use with any specially designed shaft or casting.

Write FOR THE
SYNCHRO-START CATALOG

SYNCHRO-START PRODUCTS, INC.

Automatic Engine Control Equipment
9151 NORTH RIDGEWAY AVENUE
SKOKIE, ILLINOIS

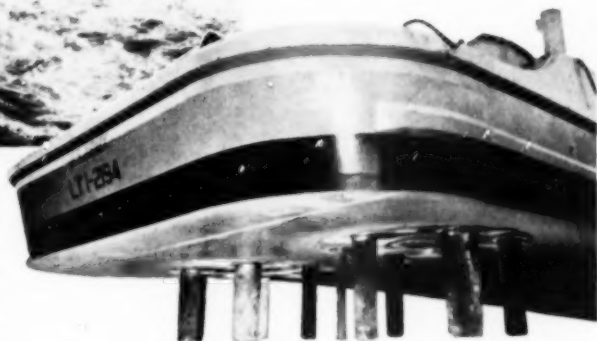
Another design and manufacturing challenge successfully met by Pacific Car and Foundry Company

VERTICAL AXIS PROPELLERS for the LTI-2194



The LTI-2194, shown above is the first U. S. river boat using vertical axis propellers, a type of propulsion new to this country and radically different from conventional screw-type propellers. Picture shows the vessel moving sideways.

In the LTI-2194, two vertical axis propellers are mounted in separate wells in the stern. At the base of each assembly is a rotor from which six metal blades project. These units both steer and propel the boat with a high degree of maneuverability. Substantially greater push astern, steering and flanking results than with other propellers.



Developed for the U. S. Army Transportation Corps by Pacific Car and Foundry Company, the vertical axis propellers for the river tug LTI-2194 are the largest ever installed. Pacific Car pioneered the design and manu-

facture of vertical axis propellers in this country and the LTI-2194 is the sixth installation made. Propellers of this type feature blades which project downward from the stern and travel in a circular orbit. The oscillating movement and varied pitch of the blades propel the boat in any desired direction without the use of rudders.

PACIFIC CAR and FOUNDRY COMPANY

RENTON, WASHINGTON

STRUCTURAL STEEL FABRICATION AND ERECTION, STEEL CASTINGS, FORGING, HEAT TREATING, MACHINING, HOT DIP GALVANIZING. TRACTOR EQUIPMENT: Winches, Logging Arches, Rigging, Dozers

CARCO

You a target?



Let's face it...we're all targets!

If your plant is not ready with a disaster plan, better act now. There's not a single American plant that's out of range of an intercontinental bomber—and fires, floods, tornadoes or explosions can kill you just as dead as an atom bomb.

It costs next to nothing to take a few simple steps which may save hundreds of lives. Here they are. Check them off today.

☐ **Call your local Civil Defense Director.** He'll help you set up a plan for your offices and plant—a plan that's safer, because it's integrated with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here,

again, your CD Director can help. He'll advise you on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First-Aid Training Courses. They may save your life.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good community relations—and no greater way of helping America.

Act now... check off these four simple points... lives are at stake... have you a right to delay?

SPACE FOR THIS

CIVIL DEFENSE

MESSAGE CONTRIBUTED BY



Rx Dr. J. J. Lamm



Fram Corporation Buys Warner Lewis Company



Putting his signature on final agreement papers when Fram Corporation, Providence, R. I., purchased the Warner Lewis Company of Tulsa, is Steven B. Wilson, Fram chairman of the board and president. Seated at right is Warner Lewis, president of the company that bears his name. Others watching from left to right are John C. Thom, Fram vice president in charge of subsidiary companies; S. Everett Wilkins, vice president and general counsel of Fram; William B. Franke, senior member of Franke, Hannon & Withey of New York, Fram's independent accountants; Fenelon Boesche, Tulsa attorney for Warner Lewis; J. N. Fitzgerald, vice president of Warner Lewis; and Arthur F. Pettet, Fram vice president and general manager.

Steven B. Wilson, chairman of the board and president of Fram Corporation, Providence, R. I., has announced the purchase of the Warner Lewis Company of Tulsa, Oklahoma. The newly-purchased company will be known as the Warner Lewis Company, Division of Fram Corporation, and will continue operations at its Tulsa headquarters.

The Fram Corporation, one of the world's largest filter manufacturers, thus acquires a wholly owned subsidiary company specializing in liquid fuel separators, filters and meter calibrating tanks. "This purchase of Warner Lewis by Fram shows continuing growth and expansion of our company which this year marks our 20th anniversary," said Mr. Wilson. "With the acquisition of Warner Lewis, Fram obtains liquid-separator production facilities and an already-established sales organization for these products. We will continue to market the Fram 'interfacial tension' type of liquid separator; and also sell the Warner Lewis 'Excelso-type' unit. Although these products are similar, each is superior to the other in certain respects, meeting all customer needs in this increasingly important industrial market," Mr. Wilson said.

Liquid separator filters are used extensively in petroleum, chemical and general industry to remove solid contaminants and water from liquid hydrocarbons, including gasoline, turbine oil, jet fuel, kerosene, diesel fuel, commercial solvents and a wide range of petroleum by-products.

Miami Motor Boat Show

The 13th Annual Miami International Boat Show will open on February 19th and run through Feb. 24th with the theme "Show it in Miami and you show the World."

Made fast to the huge Dinner Key Auditorium will

be a wide range of vessels from huge flying bridge cruisers to tiny dinghies, while outside at the dock the Detroit Diesel Engine Division of General Motors will feature a Mathews cruiser and a Chris Craft cruiser in actual water demonstrations with passengers. Inside the large auditorium diesel engine manufacturers will play a prominent part in the marine display. Caterpillar Tractor will have its usual fine display and some of the others will be Brush-Aboe, Enterprise, Onan, Fairbanks-Morse, Continental Motors and Gray Marine will also be there and feature their lightweight diesels.

EMD Awarded Union Pacific Contract

The Electro-Motive Division of General Motors

has been awarded a \$5.7 million dollar contract for a total of 205 dieselized locomotives. The U.P. stated that this was the largest order of its kind ever placed. Delivery of these units are expected to be completed by the early part of June. When these locomotives are placed in service the Union Pacific's main line will be entirely dieselized from Omaha to the Pacific Coast.

YOUR COPY OF DIESEL ENGINE CATALOG in its eighteenth completely re-edited, revised and expanded edition is now off the press. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this latest edition now. Profusely illustrated. \$10.00. Mail checks to DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, California.

Payload...75 Tons

World's largest truck uses MIEHLE-DEXTER SUPERCHARGERS



Dumping 75 tons of sand...or hauling copper are up 18% grades from pit to crusher—that's the every-day job of these giant M-D supercharged trucks used by an Arizona open-pit copper mine.

...moves more material faster at lower cost!

It takes supercharged power to haul a load like this! When Buda Diesels were selected to power the world's biggest truck, they made sure of plenty of power with Miehle-Dexter Superchargers. Buda's experience is typical. They find that simply adding an M-D Supercharger to their engines boosts horsepower as much as 50% or more! What's more, weight per horsepower is decreased. Little wonder that Miehle-Dexter Superchargers are found on so many of the country's leading Diesel engines.

You, too, can keep pace with the race for more horsepower by using M-D superchargers on your engines. The investment is usually far less than required by other methods. Write for bulletin.

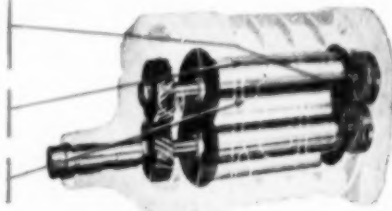
Only MIEHLE-DEXTER gives you all these features!

Internal construction uses patented rubber end plate seals. Eliminates metal contact, assures longer life, achieves fuel savings.

Special wear strips on rotors eliminate metal-to-metal contact, assure longer wear.

Lightweight aluminum rotors and housing boost power without adding weight.

Standardized parts allow easy field service.

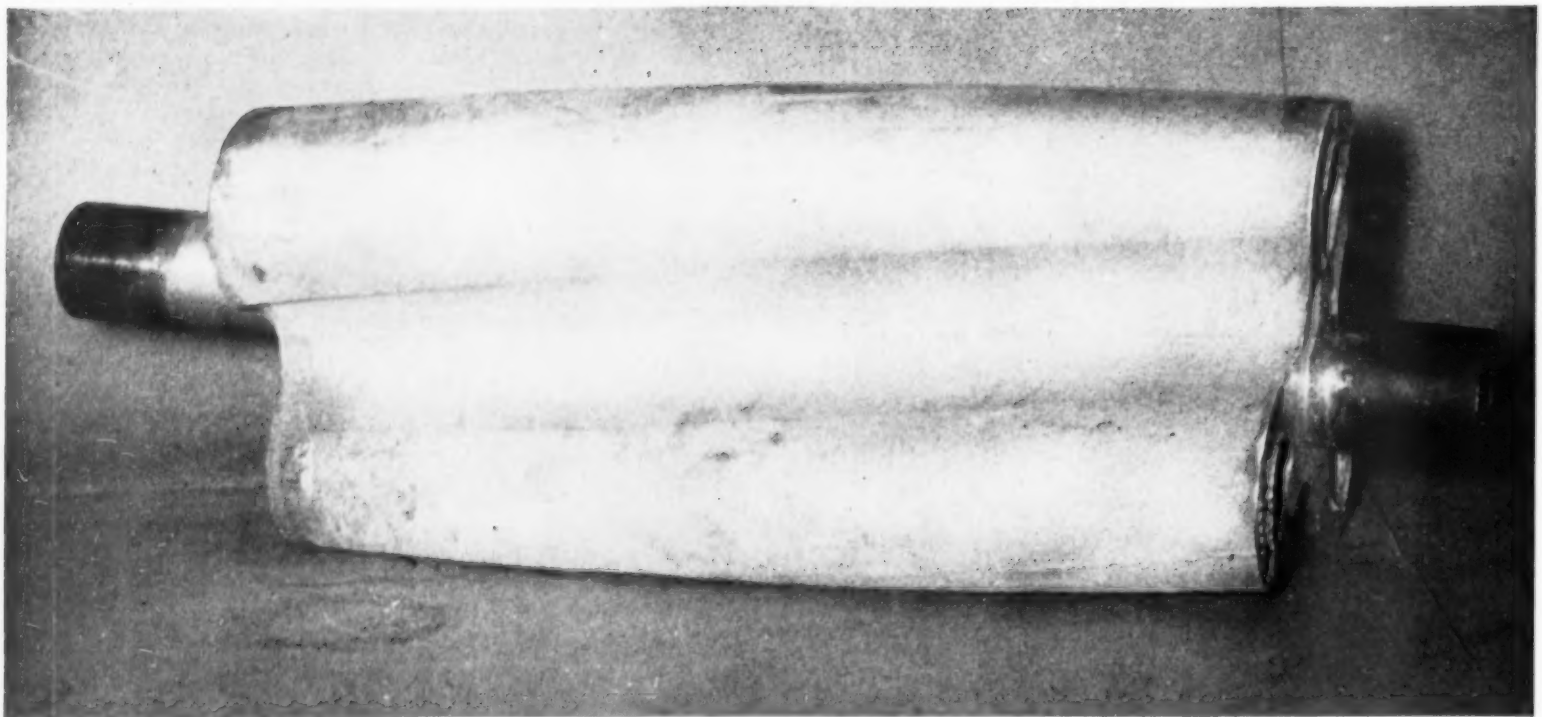


MIEHLE-DEXTER SUPERCHARGER

DIVISION OF THE BUKYER FOLGER COMPANY

104 Fourth Street

Kenosha, Wisconsin



Side view of an Al-Fin bi-metallic Roots blower rotor. Three helical cored cast aluminum lobes are bonded to a steel shaft.

BONDED BI-METALLIC SUPERCHARGER ROTOR BLOWERS

By H. W. CRUSEY

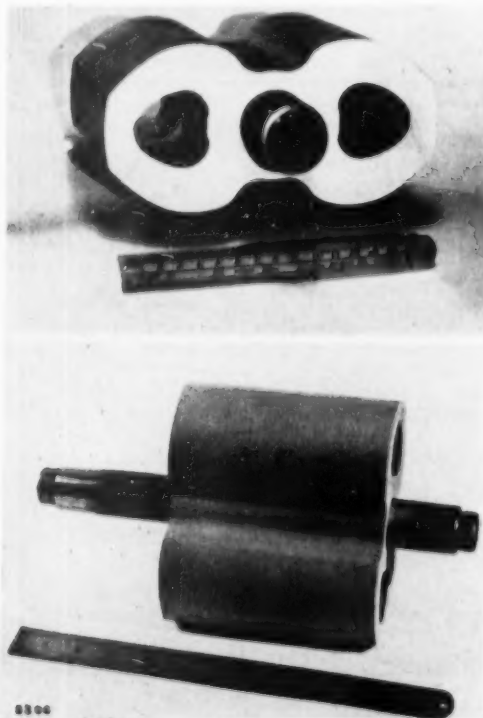
AL-FIN bonded bi-metallic Roots type blowers consisting of cast aluminum or magnesium alloy lobes bonded to steel shafts eliminate the costly lobe shaft coupling problem inherent with shrunk on or pressed-on construction. Light

metal lobes reduce supercharger weight and extend life due to reduced inertia and vibratory loadings on gears and bearings. Aluminum and magnesium are easily cast and can be economically machined to close tolerances, thus offering many production savings. Two and three lobe, straight and helical configuration blower rotors are in production in England for diesel engines.

Other diesel engine applications of the Al-Fin process for molecularly bonding the various ferrous alloys, nickel or titanium to the casting alloys of aluminum and magnesium, include aluminum pistons with bonded-in top ring grooves of alloy cast iron, large cast iron pistons with bonded-on aluminum clad skirts, plain and flanged type sleeve and thrust bearings of 6% tin-aluminum bonded to steel backs, and lightweight gear housing with bonded-in ferrous bearing cages.

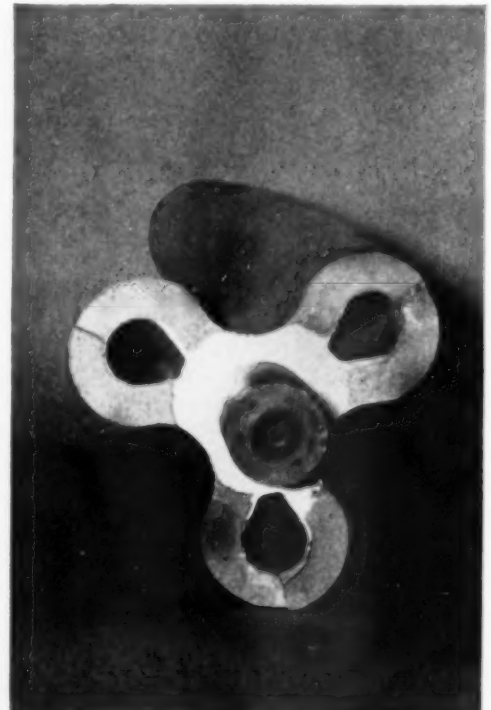
The Al-Fin bond offers no impediment to the flow of heat, is leak proof to both gases and fluids at elevated temperatures and pressures, and will withstand the differential stresses involved in high tem-

perature heat cycling. The bond has a tensile strength of the order of 15,000 psi. and will withstand shear stresses of the order of 8,000 psi. The accompanying photographs illustrate types of the bi-metallic rotors described.



Another view of a bonded bi-metallic Roots blower rotor with the aluminum lobes bonded to a steel shaft.

End view of a bonded bi-metallic Roots blower rotor showing the three helical cored cast aluminum lobes bonded to the steel shaft.



3 WIRKKALA PROPELLERS

On the Tug
INLAND CHIEF



Three new 50 x 29 in. 3-bladed Wirkkala Propellers have been installed on the Inland Navigation Co.'s tug INLAND CHIEF. The Inland Navigation Co. is one of four affiliated companies operating on the Upper Columbia and Snake Rivers.

The INLAND CHIEF is the 5th high powered river tug owned by this group of companies to be fitted with Wirkkala Propellers. The vessel is powered by three 1,000 hp. Enterprise Diesels and is skippered by Capt. A. Leppaluoto.

A preliminary statement by the Inland Navigation Co. says that the Wirkkala Propellers have "greatly reduced vibration . . . operation in swift waters with more push and less rpm's."

Invented by Oscar Wirkkala, the Wirkkala Propeller has been tested under the severest operating conditions and has proved itself the most advanced propeller in use today. Protected by world patents.

WIRKKALA PROPELLER SALES, INC.
Naselle, Washington Phone: Naselle 541

California Sales Office: 1900 Park St., Alameda, Calif.



high in performance

low in cost

parts & service
in the field



PIERCE GOVERNORS

for all Gas
and Diesel Engines

Pierce centrifugal governors are your most dependable and efficient control mechanisms for industrial engines . . . from small generator sets to monster power units . . . gas (LPG), gasoline or diesel. For engines requiring extra power to position fuel rack or valve, the Pierce centrifugal with hydraulic booster (for original equipment only) is ideal! Replacement governors and parts are available through your local distributor or fuel injection service station.

For distributor's name or information on special governing problems, write
The PIERCE GOVERNOR Co.
INCORPORATED
1612 Ohio Avenue • Anderson, Indiana



"SPECIFY PIERCE CENTRIFUGAL GOVERNORS ON YOUR ENGINES"

LOWEST Weight-Size-Horsepower Ratio
ever offered in a diesel!

the new, highpowered **MERCEDES-BENZ**

Note these exclusive features:

- **WEIGHT-SIZE-HORSEPOWER RATIO** less than that of any other diesel engine
- **PRE-COMBUSTION CHAMBER** — consumes less fuel, assures cleaner engine
- **4-CYCLE ENGINE** — less wear than a 2-cycle engine
- **COUNTER-BALANCED CRANK-SHAFT** assures unusual smoothness and quiet during operation
- **MERCEDES-BENZ COSTS LESS** than other engines of comparable power and quality

Mercedes-Benz high quality Diesels are available in a wide range of engine types — from 10 H.P. to 2500 H.P.

Mercedes-Benz Diesel Engines are on display in the showroom of our U.S. distributors — where parts and service are also obtainable.

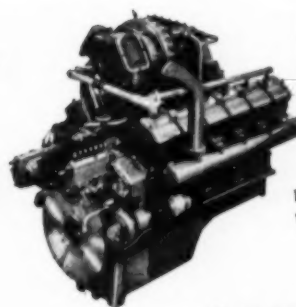
Customers and dealers are invited to visit or write:

EUROPA MOTORS BUILDING
341 East 62nd Street, New York 21, N.Y.
Phone: TEmpleton 8-8388

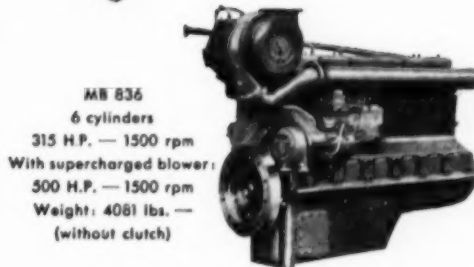
Manufactured by:

DAIMLER-BENZ, A.G.

Europe's most famous manufacturers of precision automotive, marine and industrial engines.



MB 820B
Supercharged
12 cylinders
1000 H.P. — 1500 rpm
Weight: 5622 lbs. —
(without clutch)



MB 836
6 cylinders
315 H.P. — 1500 rpm
With supercharged blower:
500 H.P. — 1500 rpm
Weight: 4061 lbs. —
(without clutch)



OM 636
30 H.P. — 2500 rpm
Length: 2 ft. 8 1/2 in.
Width: 1 ft. 10 1/16 in.
Height: 2 ft. 8 15/16 in.
Weight: 350 lbs. —
(without clutch)



PROTECTS INJECTORS

on the new

JEFFBOAT

FEATURED IN THIS ISSUE

**BRIGGS FUEL
FILTER ELEMENTS**

DO A THREE WAY JOB
... AT ONE COST

THEY FILTER ●
THEY CLARIFY ●
THEY PURIFY ●
IN ONE OPERATION



PROTECT YOUR INJECTORS ...
KEEP THEM CLEAN ...
ELIMINATE COSTLY REPAIRS ...

Fuel oil leaves the refinery in perfect condition. Oxidation and contamination start in storage. Briggs Patented Molded, Fullers Earth Elements offer three-way 100% protection against engine down time due to contaminated or dirty fuel.

Be sure your oil is clean three ways—physically - chemically - and visibly. The Briggs molded fullers earth filter element is the secret.



FOR OVER A
QUARTER OF
A CENTURY

WRITE FOR DETAILED DATA TODAY

THE BRIGGS FILTRATION COMPANY
RIVER ROAD, WASHINGTON 16, D.C.

At no obligation, please send me information showing why and how Briggs eliminates injector trouble and keeps fuel oil clean three ways.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____

Named Vice President



William J. Klein

William J. Klein, manager of the Minneapolis branch, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee, has been named vice president and general sales manager of the Tractor Division, according to an announcement by W. A. Roberts, president. Mr. Klein started his career with Allis-Chalmers as a salesman in 1928 at the Sioux Falls, S. D., branch, and shortly thereafter he became a blockman in the north-western part of South Dakota with headquarters at Mobridge. In November, 1929 he was made a special factory representative and in November, 1930 he opened the company's Minneapolis branch. While in Minneapolis, he was active throughout the entire Northwest as a civic and fraternal leader.

Transfers Office and Research Development



Taylor Dynamometer & Machine Company, manufacturers of "Hi-Eff" Equipment, have transferred their general office and research-development department to a new building, recently completed by the firm at 6411 River Parkway, Milwaukee, Wisconsin. Some manufacturing and assembly work will also be carried on at the new location.

According to a statement by Arthur C. Flamme, general manager, the move was necessitated by greatly increased sales volume in recent years. Much of the equipment manufactured by Taylor involves special engineering, to answer specific requirements of individual customers. Thus, with increased sales, it became necessary to expand existing facilities for development work. Under the "Hi-Eff" trade name, the Taylor Company manufactures a line of static balancing machines, dynamometers, and high-speed sensitive small-hole drilling machines.

Sales and Service of Engine Transferred

The Cleveland Diesel Engine Division of General Motors has announced that the sales and service of the Model 567 engine for industrial application has been transferred to the Electro-Motive Division, La Grange, Illinois. The Cleveland Division, however, will market and service the Model 567 for marine application. The Cleveland Division will also continue to sell and service for marine and industrial application the following engine models: Model 268A, 3-, 4-, 6- and 8-cyl., 150 to 500 hp.; Model 278A, 6-, 8-, 12- and 16-cyl., 600 to 1600 hp.; Model 358, 4-, 8-, 12- and 16-cyl., 800 to 3200 hp.



How much of your engine maintenance bill is due to repair of breakdowns that could have been avoided—if you'd had advance warning?

At a fraction of that cost, Alnor Exhaust Pyrometers offer you a constant check of engine performance—advance warning of

Cylinder Overload Preignition
Scaled Jackets Clogged Ports
Detonation Faulty Injection

Get the best from your diesel—minimum fuel consumption per horsepower and long service uninterrupted by foreseeable breakdowns. Get constant protection of your engine, cylinder by cylinder, with an Alnor engineered Exhaust Pyrometer System.

Get Full Information—Quickly!
Your nearby Alnor Diesel specialist is conveniently listed in the classified directory. Ask him to help you select the Pyrometer and thermocouple assembly designed for your engine. Or send for Bulletin 4361 with complete details of the full Alnor line of Pyrometers.

Every Diesel Deserves Alnor Protection.



Man knows only that
which he can measure

ILLINOIS TESTING LABORATORIES, INC.
Room 508, 420 N. La Salle St.,
Chicago 10, Illinois

Inland River Reports

By David I. Day

THE *Lin Smith* is off the repair ways at the Paducah, Ky., yards and back at work, making some shorter runs than were formerly her lot. She is one of the neatest of the nation's oil fleet to come from the yards of the Nashville Bridge Co. She uses triplet Cooper-Bessemer, 3330 hp.

THE Lake Tankers Corp., marine department, has the *Delta Cities* working on the upper Ohio in the Ashland-Huntington sector. Her normal work territory is the Mississippi, especially the upper reaches of that stream in warmer weather. Another good one in the 3000-3500-hp. range in the oil transportation field. This boat is run with Fairbanks-Morse twins.

THANKS TO Fred Moorhead who wrote from Cairo, Ill., of the neat work of the M.V. *Lehigh* in that part of the Ohio. This Union Barge Line, Superior-powered pusher is Dravo-built.

CONTINUED praise is heard from the lower Mississippi, the Cumberland, the Tennessee and the lower Ohio for the towing strength and mobility of the *Rebel Warrior*. One letter calls her the "best for her inches running out of New Orleans." This boat is owned by the Black Warrior Towing Co., New Orleans, rated at 700 hp. with Cummins diesel twins.

FROM Mrs. Blanche Kelly, New Orleans, we have a black-and-white picture showing the tug *M. D. Whiteman* taking dredging equipment to Ft. Myers, Fla. "This was a steamboat built in 1882," she explained. "Now a diesel tug using Cooper-Bessemer engine around 700 hp."

THE *Mama Lere* is said to have received the greatest amount of newspaper publicity of any river boat this year. Most of this came from the record-breaking coal tow of 20,000 tons up the Mississippi. The boat, owned by the Potter Towing Company, built by Nashville Bridge has twin General Motors engines totaling 3200 hp.

WE LEARNED some new facts from Illinois River friends recently regarding the popularity of the new *Stanton K. Smith* of the Missouri Barge Line. She has been towing oil and gasoline up from New Orleans to Illinois River ports making good time at low operating cost. We saw the boat lately at Peru, Ill., very neat and trim. Powered by General Motors twins she is rated at around 1800 hp.

WE SHALL soon see in operation the *A. H. Crane* now under construction at St. Louis Ship for the Ohio River Company, Cincinnati. The boat will have twin Baldwin-Lima-Hamilton diesel engines rated at 2120 hp.

WE MADE a brief December journey down the lower Mississippi. Upbound we noted the *Bob Fuqua* of the Roberts Towing Co., Paducah, Ky. She was under full power with five or six barges of sulphur. We understood her destination was Joliet, Ill. This 1800-hp. General Motors towboat is one of the best to her inches.

Here's the biggest advance in Compressor Valves in 25 years!



...THOMPSON-ENGINEERED to save you maintenance dollars

If you operate any type of air or gas compressors with valves from 2½" to 11½" in diameter, you can make important savings on valve replacement and compressor maintenance costs with this Thompson poppet type Valve!

See if this valve isn't everything you want for compressor service...

Simple Design — eliminates all complicated parts.

Rugged Construction — enables the valve to take the pounding of compressor service year in and year out without fail.

Increased Efficiency — gives better response to pressure and volume changes, with reduced wear on poppet valve, seat and springs.

Interchangeable — permits easy, economical changeover from your present valve equipment, regardless of type of compressor service.

Thoroughly Proven — Completely field tested over a period of several years. Thousands of these units are operating successfully in all types of installations.

Before you invest in any replacement valves, write Thompson for full details on Thompson poppet type Compressor Valves. There's a Thompson Field Engineer in your area who will gladly consult with you on your compressor requirements. Send for complete information — today!

Quick ENGINEERING FACTS ABOUT THOMPSON COMPRESSOR VALVES

Size range — 2½" - 11½"

No. of poppets — 1 to 36

Type — Nylon for pressures to 1000 psi and temperatures to 280°F. Steel for higher pressures and temperatures

Pressure range — 0 to 5300 psi

Compression ratio — 1½:1 to 7:1

Temperature range — 80° to 450°

Stock — Cap, body, screw — SAE 4140 h.t. steel. Springs — oil tempered valve spring wire

Service — Air, ammonia, butane, propane, natural gas

You can count on Thompson Products

WEST COAST PLANT — BELL, CALIFORNIA



Thompson Products, Inc.
8354 Wilcox Ave., Bell, California

Gentlemen: Please send me, without obligation, full data on Thompson Compressor Valves for _____ compressor.

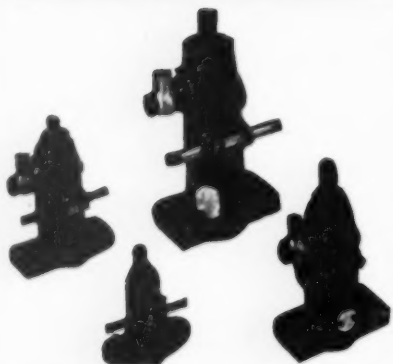
MAKE & MODEL _____

Name _____

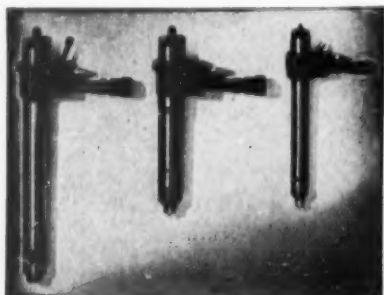
Company _____

City _____ State _____

You Can Depend On ADECO



The ADECO Model "P" Single-Unit Fuel Injection Pumps are of the "port-control" type. Simple and rugged in construction and precision built by ADECO craftsmen, these pumps are extremely reliable.



ADECO injectors are available in four sizes and a number of different styles and lengths. The ADECO water-cooled injectors are made in size No. 4 only, and have built a reputation for excellent performance where heavy fuel oils are burned.

When Ordering Fuel Injection Equipment
SPECIFY ADECO!

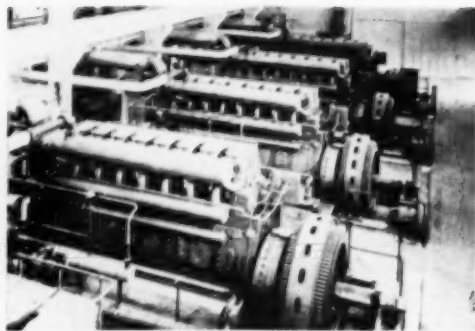
ADECO PRODUCTS
INCORPORATED

Designers and Manufacturers of Diesel Fuel
Injection Equipment



5435 N. Wolcott Avenue, Chicago 40, Illinois

Transmitters Penetrate Iron Curtain



Interior view of Voice of America transmitting station Cast, in Munich, Germany, showing four of the five Worthington Corporation 1,320 hp. diesels driving Electric Machinery Company Generators. Heat is recovered from the engine water jackets to make process steam. This steam is used for space heating and for making distilled water to circulate as coolant around the station's radio tubes.

The United States Information Service recently disclosed that two new powerful radio transmitters are beaming Voice of America broadcasts deep into Communist-ruled Eastern Asia and Siberia. A similar station in Europe is transmitting its message directly to Western Russia and to her satellite countries. In the Far East, one station, code-named Jade is located north of Manila, and the second, named John is on the Island of Okinawa. The European station is located in Munich and is known as Cast.

The report reveals that Jade and John are broadcasting daily, particularly to China, North Korea, Manchuria, and Eastern Siberia. Station Jade trans-

mits its messages in English and three Chinese dialects—Mandarin, Cantonese and Amoy—while John uses the Chinese dialects and English, plus Russian and Korean. The transmitters are eventually expected to broadcast 12 hours daily.

The three Voice stations are the most powerful radio transmitters in the world. They are far stronger than the largest stations in the United States. Each of the three stations generates its own power for the transmitters and other station requirements with five Worthington Corporation 1,320 hp. diesel engines, each driving an Electric Machinery Company generator. The rated generator capacity of each station is 5,200 kw. All diesels are designed to burn the most economical fuel available in the area.

Elliott District Manager



Raymond V. Thayer

Raymond V. Thayer has been appointed Cincinnati district manager for the Elliott Company. A native of Chicago, Mr. Thayer received his degree in mechanical engineering from Purdue University in 1941, and immediately following his graduation served four years in the Field Artillery attaining the rank of captain. He joined the Elliott Company in 1945 as a field engineer in their Cincinnati office in which capacity he served until his present appointment.

NOW SHOWING



**"WHAT YOU SHOULD
KNOW ABOUT
DIESEL ENGINES"**

NEW P&H COLOR SOUND FILM

It's an all-new sound-slide film . . . that provides clear, concise answers to "What you should know about Diesel engines." Give it a showing, and it will give you a better A to Z understanding of the diesel engine — how it operates; how it compares with gasoline engines; two versus four cycle diesels; why P&H Diesels perform better on tough jobs; how they save money on both operating and maintenance costs.

Plan a review of this educational and entertaining color sound-slide film. Ask your P&H dealer about it . . . or write us for details.

P&H

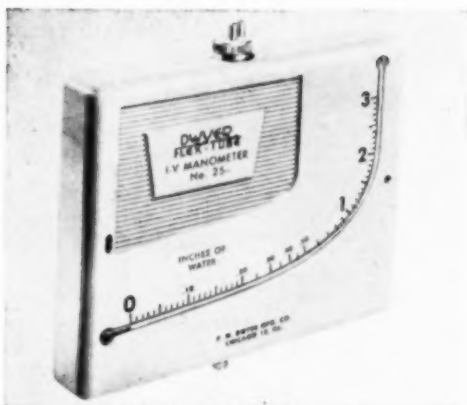
DIESEL ENGINE DIVISION

HARNISCHFEGER

CORPORATION CRYSTAL LAKE ILLINOIS



I-V Manometer

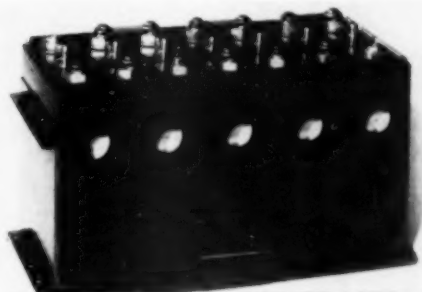


An unusually versatile gage for plus, minus and differential readings is announced by Dwyer. It is claimed that the new I-V gage will serve as air filter gage, static pressure indicator, draft gage, air velocity meter, etc. The I-V gage is equipped with a plunger type oil level adjuster. Ranges are 0-3 in. and 0-7 in. water—low range accuracy of .01 in. water. It is also available in a direct reading velocity model for use with a pitot tube, ranges 0-7000 and 0-10, 500 feet per minute. Furnished complete with tubing and fittings. This new gage is housed in an attractive, rugged molded plastic housing and said to be priced interestingly low.

Complete information may be had by writing direct to Mr. J. G. Dwyer, F. W. Dwyer Manufacturing Co., 317 South Western Avenue, Chicago 12, Illinois.

Markets New Nickel-Cadmium Battery

The Sonotone Corporation is now making available for commercial use the nickel-cadmium battery which they have been manufacturing for the armed forces. This nickel-cadmium battery is of the sintered-plate type. According to Sonotone president, Irving I. Schachtel, the long life of the Sonotone battery is its immediate advantage. Tests indicated a life expectancy of five times the lead-acid battery.



The Sonotone nickel-cadmium battery (Type 150H-10). Four of these units would be used to start a diesel engine. The unit measures 15-in. x 10-in. x 7-in.

Instead of acid this new nickel-cadmium battery uses an alkaline solution, potassium hydroxide, which has a freezing point of about -75°F , it will work under almost any weather conditions. The cells can be left indefinitely in a state of complete discharge without any damage and they can be charged at phenomenally high rates, complete charging within a half hour, without any damage. License to manufacture the Sonotone nickel-cadmium battery has been granted to the American Bosch Corporation.

Diamond-Perfect Performance for your Diesels

Complete diesel balancing

dynamic as well as static—can give up to twice the operating hours between overhauls, more power, lower fuel consumption, less vibration.

With a Stewart-Warner 704 precision electronic job-type balancer your own men can balance any engine in your own shop. It can pay for itself the first year. Use it for other balancing jobs too—armatures, gears, milling cutters, any rotating part, with a change in set-up of less than two minutes!

Write for balancing article reprinted from your trade magazine, complete information and prices on the Stewart-Warner 704 balancer. Or ask for the address of your nearest MElectro balancing service headquarters.

Merrill ENGINEERING LABORATORIES

Rm. 304, 1240 Lincoln Street,
Denver 3, Colorado

HONAN-CRANE OIL PURIFIERS

designed for diesels?

ENGINEERED SPECIFICALLY

to provide

**LONGER LIFE
GREATER EFFICIENCY
LOWER OPERATING COSTS**

for all types of
diesel engines

Three basic models, combining Honan-Crane's advanced engineering features with proven principles of design, meet all diesel engine filtering requirements... offer positive protection against costly breakdowns and excessive wear due to contaminated oil. Available for any size or make of engine. Write today for complete information.

type "B"

Bulk Refill Oil Purifier

Uses full size bulk refills of "Cranite" (fullers earth) or "Palconia" (cellulose fiber) filtering medium to remove solids, acids and products of oxidation.



type "M"

Multi-Cartridge Oil Purifier

Uses one to 24 handy, interchangeable refill cartridges containing Cranite, Palconia or cotton waste and excelsior to provide needed range in capacity.



type "F"

Free-Flow Oil Purifier

Uses interchangeable refill cartridges of Cranite, Palconia or cotton waste and excelsior. Compact design simplifies installation where space is limited.

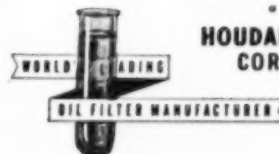


HONAN-CRANE CORPORATION

262 Indianapolis Avenue, Lebanon, Indiana

a subsidiary of

HOUDAILLE-HERSHEY CORPORATION



DIESEL USERS AGREE

that for Completely Dependable
Automatic Lubrication,
it's

Manzel

**FORCE FEED
LUBRICATORS**



DIVISION OF FRONTIER INDUSTRIES
275 BABCOCK STREET, BUFFALO 10, N. Y.

Precision Rebuilding for DIESEL - TRUCK - BUS



SPECIAL DESIGN MACHINERY

EXPERIENCED WORKMEN

ENGINEERING KNOW-HOW

CONNECTING RODS
are remanufactured to original Factory
Standards and Tolerances.

TRANSMISSION SHAFTS
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Electric Machinery Appointments



C. E. Buchan

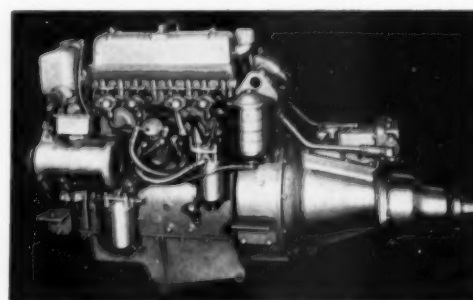


J. J. Wall

The appointment of Mr. C. E. Buchan to the newly created position of general sales manager has been announced by A. P. Burris, vice president in charge of sales of Electric Machinery Mfg. Company, Minneapolis, Minnesota. A veteran of thirty years with E-M, Mr. Buchan has been the Cleveland district manager for the past twenty-five years. Long known as one of the country's outstanding application engineers on large alternating current motors, Mr. Buchan brings a wealth of experience background to his new assignment. He will be in direct charge of the activities of the company's forty-nine domestic American offices, as well as foreign representatives.

His successor as Cleveland district manager will be J. J. Wall, for the past four years a sales engineer in the New York district office. A veteran of World War II, Mr. Wall has ten years of successful experience in the application of alternating current power machinery. Both appointments were effective January 1, 1954.

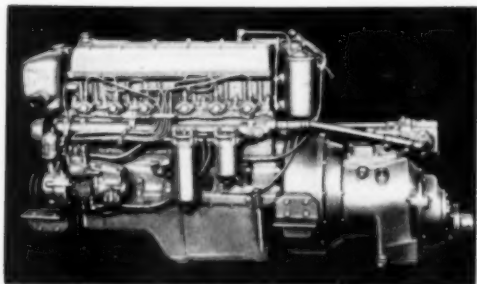
The 1954 Graymarine Diesel Line



The Graymarine lightweight diesel, Model Four-D181. This engine weighs only 750 lbs. including reduction gear, and is rated 50 hp. at 2400 rpm. The fuel injection pump is a Roosa-Master.

The Graymarine line for 1954 includes the introduction of a new diesel engine and an improvement on an old model. The new model, the Four-D181, is a lightweight engine originally developed for the U. S. Navy. This is a 4-cylinder engine with piston displacement of 181 cu. in., rated 50 hp. at 2400 rpm., weight 750 lbs., including reduction gear. This is almost exactly one-half the weight of the successful lightweight 6-cylinder diesel which Gray introduced last year. This new engine is equipped with a Roosa-Master fuel injection pump. These lightweight, high speed diesels represent a new trend in marine engines, achieving savings in weight by improved design and by use of aluminum castings, made possible by fresh water cooling. They contrast with the ponderous, slow speed diesels of earlier years and are so compact that they can be installed interchangeably with gasoline engines. Gray's Model Six-D427, the improved 6-cylinder en-

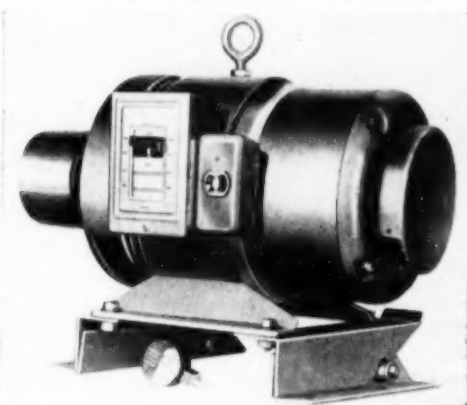
DIESEL PROGRESS



The Graymarine Model Six-D427, for both heavy cruisers and workboats. Improvements over last year's version include the new Bosch PSB fuel pump.

gine, now has a continuous duty-rating of 100 hp. at 2200 rpm. Improvements in design include replacement of the Bosch APE injection pump with the new Bosch PSB single plunger pump.

Tractor-Drive Generator for Standby



A new generator, designed for belt-drive and producing regular highline type electricity, is offered by D. W. Onan & Sons Inc. With this generator, tractor owners can now provide their own low-cost emergency electric power when commercial power is off, or voltage drops. Available in 3,000, 4,000, 7,000 and 10,000-watt capacities, the new "Tractor-Drive" generators supply exactly the same 115/230 volt, 60-cycle alternating current delivered by the commercial power lines.

Mounted on a pivot-type base which maintains correct tension on the belt at all times, the new generator is equipped with a non-slip, flat belt pulley. Although designed to take overloads, a protective circuit-breaker mounted in a box with convenient knockouts guards against excessive overloads. A plug-in ac. voltmeter, together with a single receptacle, permits the tractor engine speed to be adjusted for desired voltage. Easy to set up, the new Onan "Tractor-Drive" generator is simple to connect both electrically and mechanically and when power outages occur can be ready to operate within minutes. Standard equipment includes an outdoor 2 pole, double throw, 60-ampere manual transfer switch. This new standby belt-driven generator is constructed and tested to conform to NEMA standards.

Air-intake and exhaust louvers of ample size permit cooling air to be drawn through the generator by a centrifugal blower. Drip-proof protective housings shield the internal parts against water, grit and dirt. Easily removable covers simplify inspection and cleaning. For further information, write D. W. Onan & Sons, Inc., Minneapolis, Minnesota. Specify Form A269.

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WATER SEPARATOR & FUEL FILTER

A new patented filter which removes 100% of water from diesel and other fuels is being introduced by the Fram Corporation, Providence 16, R. I., one of the world's largest filter manufacturers. The newly-developed Fram water separator and fuel filter functions entirely different from any fuel filter yet developed, according to the



The new Fram Water Separator & Fuel Filter combination unit, which completely removes water from diesel and other fuels, while filtering out dirt, rust and solid particles down to 1 micron (.000039-in.) in size.

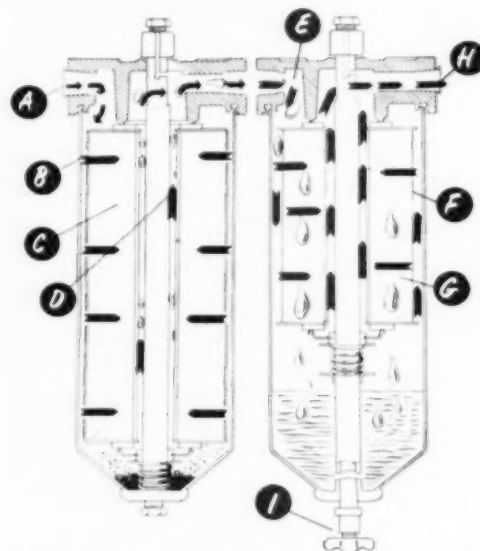
manufacturer. Fram has thoroughly field tested the new filter for more than a year before adding it to the company's complete line of primary and secondary fuel filters. Fram engineers claim the new combination filter is the most important diesel engine protective maintenance development in 20 years. The water separator and fuel filter is a combination unit mounted in series, consisting of a fuel filter and water separator unit. Both filters use replaceable cartridges.

In the initial stage, the fuel filter unit filters out dirt, rust, and other solid contaminants in one pass down to 1 micron (.000039-in.) while condensing water in the fuel into large droplets. Then the clean fuel and water droplets pass through a connecting nipple into the water separator unit. In this second stage, water collects on the outside surface of the separator cartridge, and drops into the sump. Water is easily removed from the filter sump by a drain valve. By the time the fuel reaches the outlet of the second unit, the fuel has been micronically filtered free from solid contaminants, and 100% of water has been removed. The unit works equally well on both fresh and salt water. In recent years, the presence of water in diesel fuel has been discovered to be as dangerous as solid contaminants. Water causes acid corrosion of injector parts; and when water in the fuel flows at high speed, a severe wearing action is set up between the highly polish surfaces of valve seats and the finely machined holes in the injector nozzles.

The new unit enables diesel engine operators to stop the replacement of expensive injector parts due to abrasive action of solid contaminants and the acid effects of contaminating water. It can be quickly and easily installed on diesel engines 225 horsepower and under, can be used for trucks and busses, marine and construction equipment, logging, petroleum and mining engines, industrial engines, and agricultural implements. Fram also manufactures larger liquid separator units for higher horsepower industrial engines.

Fram reports a test made in Missouri. The superintendent of automotive equipment of the Missouri Pacific Transportation Company in St. Louis tested the combination Fram water separator and fuel filter on a GMC 4-71 diesel bus by pouring water into the fuel. Before starting on an unscheduled run, the Missouri Pacific drained all the fuel from their coach fuel tank. Then, 7 quarts of water were poured into the fuel tank, and 25 gallons of

diesel fuel were added. A special large-size accumulator tank was added below the water separator unit to handle the extreme amount of water in the fuel. The bus was driven 35 miles on the highway at all types of speeds; a stop of 20 minutes was made, and then the bus continued on for approximately 15 miles before returning to the bus garage. Both city and highway driving was included in the test drive.



Cutaway drawing, showing how the new Fram water separator and fuel filter operates: A. Fuel enters filter inlet. B. Fuel contacts fuel filter cartridge and dirt, rust and solids are filtered out in one pass down to 1 micron (.000039-in.) in size. C. Water in fuel is coalesced or brought together, forming large droplets for separation. D. Fuel and water droplets pass up center tube and out of fuel filter. E. Fuel and water droplets enter separator filter. F. Water collects on outside surface of separator cartridge and then drops down into sump. G. Fuel then passes through separator cartridge. H. Clean filtered fuel, completely free of water, then leaves and goes on to the injectors. I. A drain cock is provided on the separator filter for easy water removal.

Upon completion of the 100 mile drive, the accumulator tank was completely full of the entire amount of water added to the fuel at the beginning of the test. For further information on the new Fram water separator and fuel filter, write Fram Corporation, Providence 16, R. I.



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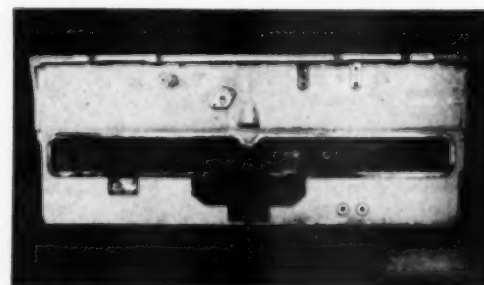
Illustrated is a 1125 DAS Buda Diesel engine block as it was received after "throwing a rod" and as it left our plant after being repaired. There is practically no limit to the size and complexity of castings which can be restored. All ferrous and many non-ferrous metal castings can be repaired the Guth-Pascoe way! It will pay you to investigate Guth-Pascoe when an emergency arises.

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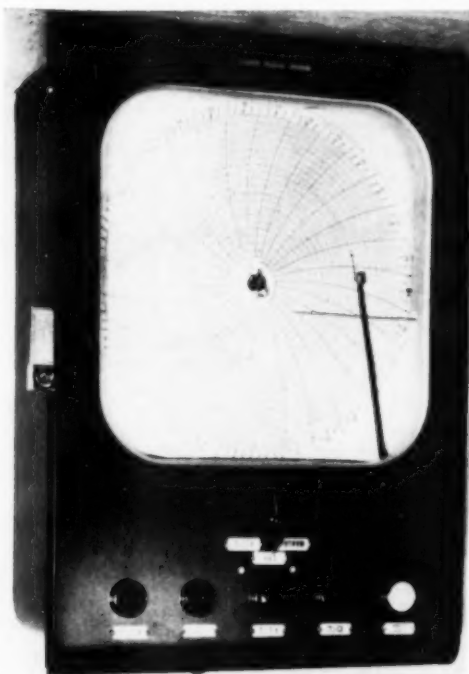
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Automatic Engine Control Set



Outside view of the Super BAW Series engine control set.

IN addition to providing full automatic starting and stopping of the engine as required for its application, this automatic engine controller periodically test starts engine and records operation. It assures dependable operation at all times by test starting it at any desired intervals, running it for a pre-set time and actually recording the operation on a 30 day chart. Practically all cases of failure of an engine to start when required are due to neglect of regular testing and maintenance. This control combats this situation by automatically test running the engine at intervals to keep all moving parts lubricated, the fuel system primed and the batteries charged. Every time the engine starts either on test or regular runs the operation is recorded on an electrically driven 30 day chart which provides a permanent record of the engine operation. This self testing is entirely independent of the normal starting function and does not prevent operation from its demand switch at any time.

Full safety protection with individual signal lights and an alarm circuit is provided for failure to start, low oil pressure, and overheating. Additional

safety protection and signal lights can be furnished for overspeed, low water, etc. as required. The entire control is housed in the recording meter case for easy wall or panel mounting. A program clock allows the operator to set up the test runs for any convenient time of day and on any particular days of the week desired. The adjustable timing motor can be set to give test runs up to 30 minutes or more to assure thorough warm-up of the engine to drive out condensation and prevent sludge formation. As in all Custom Built Controls the cranking cycle is fully adjustable to meet any condition of the engine or installation to give the best possible chance to start and at the same time protect the starting system. Models are available for either electric or air start engines of any type or size.

Further information and more complete details on this automatic engine controller are available from Custom Built Controls, 1801 Rand Road, Des Plaines, Illinois.

P&H Marine Diesel Engines for 1954

The 1954 line of P&H marine diesels offers complete coverage in the popular horsepower range. There are 2, 3, 4 and 6 cylinder models with piston displacement up to 525 cubic inches.

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Gulf Coast News

By Michael T. Pate

HAMILTON Mill & Elevator Company, Hamilton, Texas, has purchased through Stewart & Stevenson Services, Inc., of Houston the power equipment for a new flour and feed mill to be built at Lampasas, Texas. The equipment includes a General Motors series 71 6-cylinder dual fuel engine rated at 100 hp. continuous loading at 120 rpm. to power a pellet mill and a General Motors series 71 4-cylinder dual fuel engine rated at 89 hp. at 1600 rpm., to power a hammer mill. Both engines were unitized to the equipment they are to drive in the shops of Stewart & Stevenson Services, Inc., ready to place sub-bases on concrete foundations and grout in place.

MANUEL Garza Gonzales, Del Rio, Texas, has bought from Waukesha Sales & Service, Houston, a Waukesha diesel, model 190 DLCU, rated at 54 hp., to drive a centrifugal pump in irrigation service.

A. K. KNUDSEN, Jr., Brownsville, Texas, has bought through Spriggs Engine & Marine Company, of Brownsville, a General Motors diesel, series 110, model 62200. This six-cylinder engine will drive, through a 4.5:1 reversible reduction gear, a 72 foot trawler being built for the owner.

BANKS-MORELAND Company, Houston, has bought through Houston Engine & Pump Company, Houston, a Murphy model 21 diesel, rated at 150 hp. at 1200 rpm., which will drive a 100 kw. generator for automatic welding.

DAN Trigg, Breckenridge, Texas, has bought through Stewart & Stevenson Services, Inc., a General Motors series 71 diesel to repower a model 225 Lorain 3/4 yard dragline unit for use in his general earth-moving contracting.

DAVID Southard, Hockley, Texas, has bought through Houston Power & Equipment Company, Houston, two International Harvester wheel tractors, model WDR-9, rated at 58 drawbar hp., for use in his farm work. These two diesel tractors are first replacements by diesel in his fleet of gasoline-powered tractors.

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Los Angeles 46, Calif.

OILWELL Supply Company, Houston, has bought through Stewart & Stevenson Services, Inc., of Houston, a General Motors series 110 diesel, model 62400, complete with torque converter and heat exchanger unit to power a chain-driven Oilwell model 212 pump on the drilling barge being built for Magnolia Petroleum Company by Livingston Shipyard Co., Beaumont, Texas.

SAM Snodgrass, Port Isabel, Texas, has bought through Spriggs Engine & Marine Company, Brownsville, Texas, a series 110, General Motors diesel marine propulsion unit with 4.5:1 reversible reduction gear to power a 72-foot trawler being built by the owner for Gulf fishing.

WYATT C. Hedrick, Houston, has purchased a dieselized irrigation system through Stewart & Stevenson Services, Inc., who are now constructing the barge and equipping it with a General Motors series 110 diesel powering a 12x14-inch Gould horizontal split case pump to deliver 6500 gpm. at 80 ft. head. The barge will be floated in the Rio Grande near Laredo and used to provide irrigation for cotton on the owner's Apache ranch.

VERNON Whiteley Drilling Company, Tyler, Texas, is repowering a No. 15 Unitrig with two General Motors series 110 twin six diesels which will furnish power for the drawworks and the main mud pump on the company's oil well drilling and servicing rig.

AUTOMATIC Pump & Equipment Company, Beaumont, Texas, has purchased from Hercules Motors, Houston, two Hercules diesels, model DIX4D, delivering 48 hp. at 2200 rpm. The units will be installed in a ferry being constructed for the State of Louisiana to power auxiliary generator, water pumps and air compressors.

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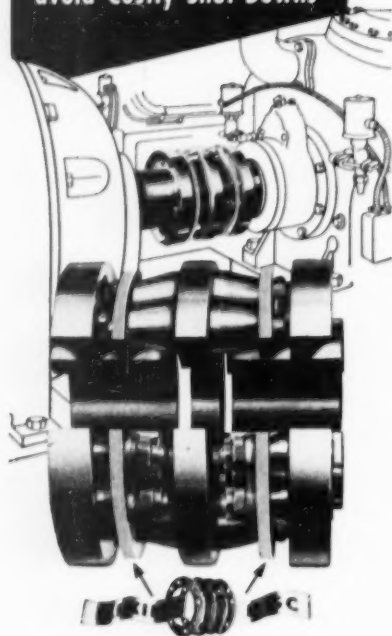
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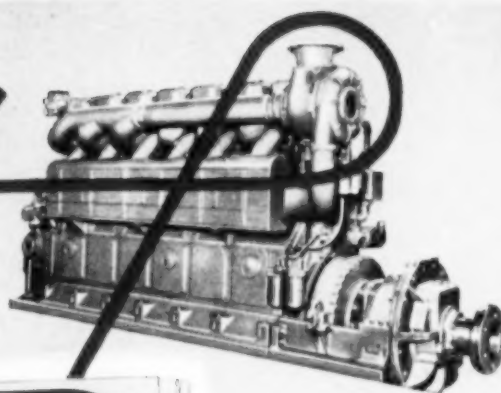
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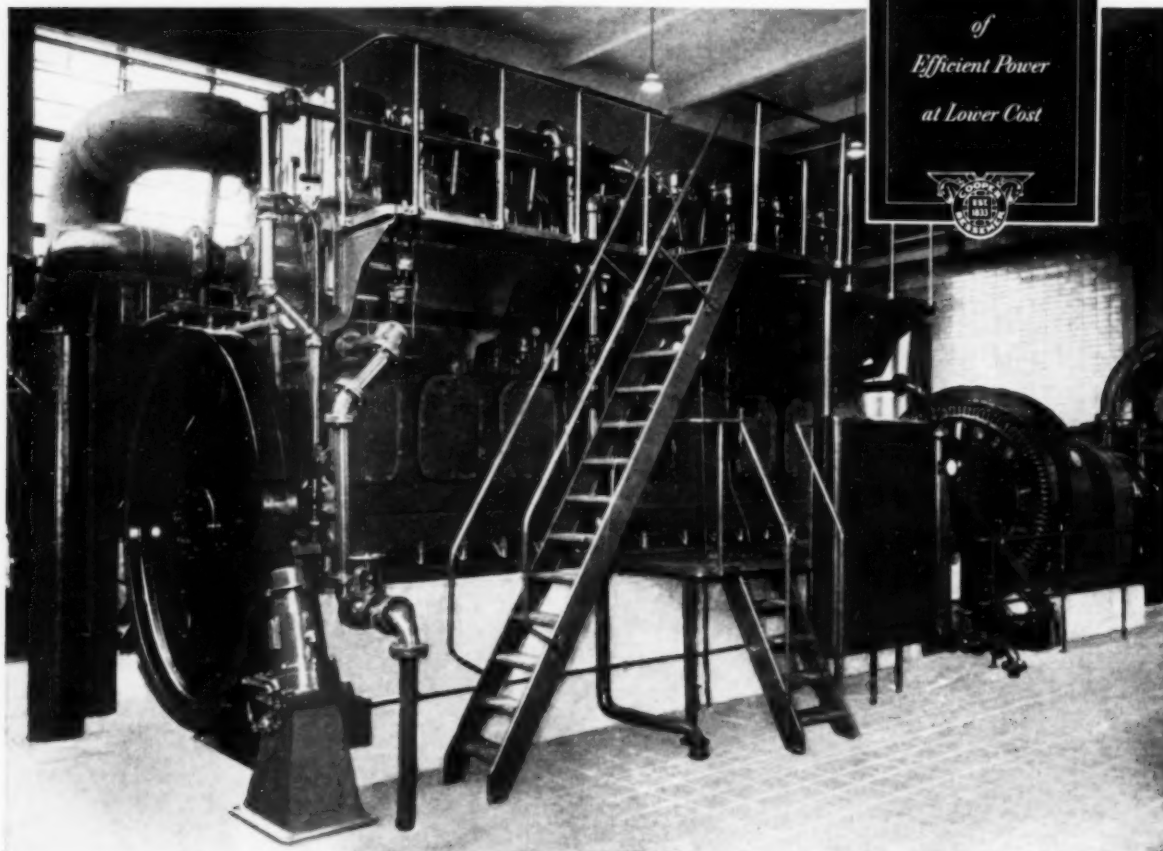
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